**Application**

The input module for binary signals 81 EB10 is used to input 32 standard binary signals to the IO-bus.

It converts the binary values arriving from the process in parallel form into serial data which are suitable for transfer via the IO-bus.

The binary values can be produced either by contacts or electronically.

Accordingly, the module is available in two hardware versions which differ only by the equipment of the module inputs.

- 81 EB10-E/R0100 for input of electronically produced binary values.
- 81 EB10-E/R0200 for input of binary values produced by contacts.

**Features**

The module can be plugged into every multi-purpose processing station of the PROCONTROL bus system. It has a slot requirement of 1 division.

It incorporates a standard interface SEA to the IO-bus.

The module receives the binary signals from binary value transmitters installed in the process and transfers the binary values in the form of telegrams via the IO-bus to the PROCONTROL bus system.

The code switches for setting the module address can be set with the module withdrawn and read through a cut-out on the module front.

In the version 81 EB10-E/R0200, the module produces a higher contact voltage by connecting the binary signal produced by the contact to the negative bias voltage UV.

If the negative bias voltage UV fails, the function of the module remains fully effective.

For both module versions, the binary value transmitters must be supplied locally since there is no power supply for the transmitters.

There is no interaction between the bus side and the process. No provision is made for potential isolation.

Any disturbances in data output and disturbances in the processing section of the module are detected and indicated on the module front by a red light-emitting diode ST.

At the same time, disturbance annunciation signal SME is output via the IO-bus.

The module occupies two successive addresses on the IO-bus in both module versions.

The module inputs EB01...EB32 are protected against overvoltages of up to 1.5 kV in accordance with GKWE 800 035.

**Important:**

For system reasons, the module inputs EB01 and EB17 should not be used when the IO-bus cooperates with the station bus.
Description

Basically, the module consists of three functional blocks:

- Acquisition and conditioning of the binary input signals arriving from the process.
- Parallel/serial conversion of the conditioned binary signals.
- Bus adaption with output of the binary values in the form of telegrams to the IO-bus after the module has been called.

SIGNAL INPUT

The module is designed to scan up to 32 binary value transmitters which are installed in the process.

The binary values are acquired by the input circuit in parallel form with a time delay of 7 ms (filter time constant).

These binary signals are converted into serial form to make them acceptable to the IO-bus, and sent to the IO-bus as data telegram when the module is called.

The up to 32 binary values are received by the module via process connector X2.

WIRING OF UNUSED FUNCTION UNITS

It is not necessary to wire unused function units.

DATA OUTPUT TO THE IO-BUS

Whenever the module is called by its starting address, it transfers the binary data to the IO-bus during the next two transfer cycles.

The standard interface SEA to the IO-bus is provided by the bus connector X1.

The bus connector X1 also incorporates the feed in for supply voltage US, zero potential Z and, in the case of module version 81 EB10-E/R0200, for negative bias voltage UV.

Setting of the module

SETTING OF ADDRESS

The module address is to be set on the module using address switches S2 and S3.

The address is set with the module withdrawn.

The address switch S1 is permanently wired in the module. This position of the address switch S1 is marked by 0 on the front panel above the cut-outs for switches S2 and S3.

Possible setting of the hex. code address switches:

<table>
<thead>
<tr>
<th>1.Addr. switch S1</th>
<th>2.Addr. switch S2</th>
<th>3.Addr. switch S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>always 0</td>
<td>adjustable 0 - F</td>
<td>adjustable 0/2/4/6/8/A/C/E</td>
</tr>
</tbody>
</table>

The address set on the address switches is the address of the 1st function unit of the module (module starting address). It can be read on the module panel.

If the module is used in connection with a bus coupling module 88 QT02, value 0 must be set on address switch S1 (is permanently set).

By setting the 1st address switch to position "0", the bus coupling module 88 QT02 is notified that no specification telegrams are transferred by the module.
Data communication with the module

FORMATION OF ADDRESS

The bus control module transfers address telegrams of 16 bit length to call the individual modules connected to the 10-bus.

In the module, every incoming address is compared with its own module starting address.

This comparison takes place in parallel mode.

The address transferred by the bus control module and required by the module for comparison is evaluated as follows:

```
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
```

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<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>P</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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</table>

Address switch S3

Address switch S2

Address switch S1 (always 0)

Parity bit

always 000

The module responds when in the address telegram
- bits 13, 14, 15 = logic "0",
- the transferred address agrees with the address
  set on the module,
- the sum of all bits set to logic "1" is odd
  (parity check).

Formation of telegrams

Two data telegrams are formed by the module, which are sent to the 10-bus during the next two transfer cycles after the module has been called.

DATA TELEGRAM

The binary values of the first 16 binary value transmitters EB01...EB16 are transferred under the even-numbered first module address (module starting address), the binary values of the next 16 binary value transmitters EB17...EB32 are transferred under the subsequent odd-numbered module address.

The data telegrams have a length of 16 bits and the contents specified below.

Data telegram of the first 16 binary value transmitters under the even-numbered first module address:

```
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
```

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</table>

EB16

EB01

EB02

Data telegram of the second 16 binary value transmitters under the subsequent odd module address:

```
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
```

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</table>

EB32

EB17

EB18
Annunciation functions

Disturbances in the module and in the communication with the IO-bus are detected and signalled by the module.

Disturbances can be signalled by the module in the following two ways:

- Visual disturbance annunciation on the module by the red light-emitting diode ST visible on the front which emits a steady red light in the event of a disturbance.

- Annunciation via bus line SME of the IO-bus.

ANNUNCIATION ON THE MODULE

The red light-emitting diode ST is connected with bus line SME.

It emits a steady light when a disturbance annunciation is transferred via bus line SME.

ANNUNCIATION TO THE IO-BUS

- If the module is not addressed by a valid address telegram within 7 s.
  
  Disturbance annunciation signal SME and light-emitting diode ST are set.

  If the module is called again by the bus control module, SME and ST are reset again after 200 ms.

- If one or more bus connecting lines are interrupted or disturbed.

  Disturbance annunciation signal SME and light-emitting diode ST are set as long as disturbances are present.

  After the disturbances have been removed, SME and ST are reset again after 200 ms.

- If disturbances occur in the internal sequential cycle, e.g. in parallel/serial conversion.

  Disturbance annunciation signal SME and light-emitting diode ST are set as long as disturbances are present.

  After the disturbances have been removed, SME and ST are reset again after 200 ms.
Functional diagrams

MODULE VERSION 81 EB10-E/RO100

The module consists of a printed circuit board (see "Mechanical design") which is equipped with connectors X1 and X2 as well as two address switches S2 and S3 (S1 is permanently wired to 0).

TERMINAL DESIGNATIONS:

Connector X1 incorporates the standard interface SEA and the operating voltage supply. Connector X2 incorporates the process inputs EB01 to EB32.
The module consists of a printed circuit board (see "Mechanical design") which is equipped with two connectors X1 and X2 as well as two address switches S2 and S3 (S1 is permanently wired to 0).

Connector X1 incorporates the standard interface SEA and the operating voltage supply. Connector X2 incorporates the process inputs EB01 to EB32.
Connection diagrams

MODULE VERSION 81 EB10-E/R0100

The module has 32 binary value inputs for electronically produced binary signals.

MODULE VERSION 81 EB10-E/R0200

The module has 32 binary value inputs for binary signals produced by contacts.
Mechanical design

The mechanical design of both module versions is the same.

Board size: 6 U, 1 T, 160 mm deep

Connector: to DIN 41 612

1 x for 10-bus connection 48-pole,
edge connector type F
(connector X1)

1 x for process connection
32-pole,
edge connector type F
(connector X2)

Weight: approx. 0.42 kg

The exact contact allocation of the individual connectors can be seen from operating principles description "Connectors of the 10-bus modules" GKWE 705321 or from the functional diagram of the module.
POSITIONS OF THE ADJUSTABLE COMPONENTS AND VISUAL DISPLAYS ON THE FRONT

The front panels of the module versions R0100 and R0200 as well as the functions of the components shown are the same.

![Diagram of front panel with components labeled]

Light emitting diode for disturbance annunciation ST

<table>
<thead>
<tr>
<th>Significance</th>
<th>Hexadecimal</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>100</td>
<td>256</td>
</tr>
<tr>
<td>S2</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>S3</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Switch S1 is permanently wired to 0 and shown as imprint on the front of the module.
POSITIONS OF THE ADJUSTABLE COMPONENTS ON THE PRINTED CIRCUIT BOARD

The printed circuit board incorporates the two address switches S2 and S3 for setting the module starting address (address switch S1 is permanently wired to 0) as well as the two connectors X1 for 16-bus connection (standard interface SEA) and X2 for process connection.
Technical data

In addition to the system data, the following values apply:

**MODULE VERSION:**

**POWER SUPPLY**

<table>
<thead>
<tr>
<th></th>
<th>RO100</th>
<th>RO200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage:</td>
<td>19.5 ... 30 V</td>
<td>19.5 ... 30 V</td>
</tr>
<tr>
<td>Operating voltage $U_0$:</td>
<td>24 V</td>
<td>24 V</td>
</tr>
<tr>
<td>Negative bias voltage $V_N$:</td>
<td>-</td>
<td>-24 V</td>
</tr>
<tr>
<td>Current consumption $I_{typ}$:</td>
<td>30 mA</td>
<td>30 mA</td>
</tr>
<tr>
<td>Power dissipation $P_{Vtyp}$:</td>
<td>0.7 W</td>
<td>0.7 W</td>
</tr>
</tbody>
</table>

The values specified for $I_{typ}$ and $P_{Vtyp}$ apply for unloaded outputs. To obtain an exact value, the input loads must be added.

**Reference potential 10-bus $Z$:**

<table>
<thead>
<tr>
<th></th>
<th>0 V</th>
<th>0 V</th>
</tr>
</thead>
</table>

**INPUTS**

**Number of binary value transmitters to be connected:**

<table>
<thead>
<tr>
<th></th>
<th>32</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input designations:</td>
<td>E601 ... E632</td>
<td>E601 ... E632</td>
</tr>
</tbody>
</table>

The binary inputs are protected acc. to GKWE 800 035 up to 1.5 kV.

**INPUT VALUES OF STANDARD CURRENT INPUTS**

<table>
<thead>
<tr>
<th></th>
<th>-30 V ... +30 V</th>
<th>-30 V ... +30 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage of inputs:</td>
<td>24 V</td>
<td>24 V</td>
</tr>
<tr>
<td>Operating voltage of inputs $U_i$:</td>
<td>1.6 mA</td>
<td>5 mA</td>
</tr>
<tr>
<td>Input voltage for logic 0:</td>
<td>-30 V ... 3 V</td>
<td>-30 V ... 3 V</td>
</tr>
<tr>
<td>Input voltage for logic 1:</td>
<td>11.2 V ... 30 V</td>
<td>11.2 V ... 60 V</td>
</tr>
<tr>
<td>Filter time constant typ.:</td>
<td>7 ms</td>
<td>7 ms</td>
</tr>
<tr>
<td>Input resistance to $Z$:</td>
<td>15 kΩm</td>
<td>-</td>
</tr>
<tr>
<td>Input resistance to $U_i$:</td>
<td>-</td>
<td>9.4 kΩm</td>
</tr>
</tbody>
</table>

**OUTPUTS**

**Output designation:** SEA standard interface 10-bus
MODULE VERSION: R0100 R0200

PERMISSIBLE TEMPERATURE RANGES

Operating temperature: 0 °C ... 70 °C 0 °C ... 70 °C
Storage temperature: -40 °C ... 85 °C -40 °C ... 85 °C

ORDERING DATA

Complete module:

Type designation: 81 EB10-E/R0100 Order number: GKWEB50000R0100
81 EB10-E/R0200 GKWEB50000R0200

Technical data are subject to change without notice: