Application

The output module is used to activate electronic inputs, relays and lamps.

The module contains 16 function units. It is thus possible to output 16 different binary signals simultaneously.

The outputs of the module can activate the following loads:
- up to 50 standard loads PROCONTROL electronic inputs or
- one lamp with a rated current of 100 mA at a rated voltage of 24 V or
- one relay with 100 mA current consumption. The quenching diode is already incorporated in the module for this; or
- other loads of up to max. 100 mA current consumption

The module incorporates an input (TL) with which all outputs can be activated simultaneously (e.g. for lamp testing).

The module is available in 2 versions:
- 81AB01–E/R1010 with 16 light-emitting diodes at the front to indicate binary signal outputs.
- 81AB01–E/R1110 like R1010, but without the 16 light-emitting diodes

Features

The module can be plugged into any multi-purpose processing station of the PROCONTROL bus system. It incorporates a standard interface to the PROCONTROL station–bus.

The module receives the signals to be output from the PROCONTROL bus system via the station–bus in the form of telegrams. The telegrams are checked for faultless transfer by means of the parity bits before being output.

The binary signal outputs are short-circuit-proof. They have a common reference conductor.

The output signals are supplied potential–isolated to the output section. The output circuits are supplied with their own operating voltage to eliminate any interaction between the bus side and the process side.

The output signals can be simulated individually via the control system operator station. A simulated output is indicated by a light-emitting diode (SIM) at the front of the module and is recorded by the control system operator station on a logger and displayed on a screen.

Any disturbance in the processing section is indicated by a disturbance annunciation (ST) at the front of the module.

Signal input

Signal input from the bus

The module receives, via its standard interface to the station–bus, all telegrams that are transferred by the local bus/station–bus coupling module. Transfer takes place serially; therefore the processing section performs a serial/parallel conversion of the data.

Signal input from the process

The output section of the module incorporates the binary input TL. This is located on the process plug connector. All 16 outputs AB1 to AB16 provide a "1" signal simultaneously when a "1" signal is applied to TL. In this way, for example, lamps connected to the module can be tested.
Signal recognition

The following information is implemented in the address section of the data telegram:

- System address (possible 0 ... 3)
- Station address (possible 1 ... 249)
- Module address (possible 1 ... 58)
- Register address (max. 0 ... 63 for signals 246 for diagnosis data)
- Bit address (possible 0 ... 15)

They help to clearly identify the signal by the transferring module. By its program, the processing section knows which telegrams are to be evaluated and which data bit is to be written to which memory location of the output register (see "Data communication ... ").

Signal output

The module only passes on a signal of a received telegram to an output if it has established

- by means of the parity bits in the telegram, that the data were transferred and received error-free
- by means of an address comparison, that the signal is allocated to one of its outputs.

In the case of digital data transfer, every bit of the 16-bit data word is an independent single signal. It is possible that only one or several bits of the whole data word are intended for the individual output module. It is also possible, for example, for the binary signal bit 8 of the data word to be assigned to module output 13. The possible maximum of 16 data words of the maximum of 16 different transferring modules are written to 16 registers of the shared memory (see "Data communication").

With the aid of its bus address list and a marshalling list, the microprocessor is able to allocate the various registers to the module outputs (bit multiplexing mode).

The first function unit is described below for further signal output. The others operate similarly.

The 16 selected output signals are transferred to the output section. An output register with 16 memory locations has been provided there. This register stores the values until the next output cycle is performed by the PROCONTROL bus system.

The memory location output activates light-emitting diode 1 (R1110 only) and simultaneously, in potential-isolated mode the output amplifier which provides the binary signal at outputs AB1 and Z1.

If electronic modules having the same main power supply as the output section of the module (same Z) are activated, single-pole signal transfer is possible here.

The binary output incorporates a quenching diode for activating inductive loads and an output diode for the simple formation of external OR functions.

Sink time monitoring

The module is provided with a time monitoring feature for supervising the incoming telegrams for cyclical renewal. If any of these telegrams is missing (e.g. failure of the source module), the module responds as follows:

- the corresponding binary output(s) is (are) set to "0"
- a bit is set in the diagnosis register, the light-emitting diode for disturbance annunciation ST is set and the signal "Common disturbance Station" is output.
Operating modes

In addition to the normal signal output, the module also incorporates simulation and diagnosis functions.

Simulation of the output signals

The output signals can be simulated individually. This is performed via the control system operator station.

During the simulation, data telegrams are sent to the module which contain the signal value to be simulated as well as the address of the output requested.

The processing section blocks the real signal value and transfers the value to be simulated to the output register instead.

Further signal output proceeds as described above.

The red light-emitting diode SIM at the front of the module is set for as long as one or more output signals are being simulated.

Diagnosis

The processing section of the module continuously monitors the reception of the data telegrams and their processing (self-diagnosis).

In the event of a disturbance, the type of disturbance is filed in the diagnosis register (see “Data communication...”) and a disturbance annunciation is simultaneously sent to the PROCON- TROL bus system. The diagnosis register is then read out from the control system operator station for evaluation.

It is also possible to scan the current status of the module at any time from the control system operator station (remote diagnosis).

Data communication with the module

Signal allocation

The addresses of all the telegrams whose data are to be output are programmed in the module via the control system operator station. In this way the module knows (address comparison) which of the data telegrams received have to be processed. The module outputs at which the various converted signals have to be made available are also programmed.

The 16 binary output signals can originate from a maximum of 16 different telegrams.

The 16 binary output signals are also written to the 0 register of the shared memory parallel to the output register. These can be both normal and simulated output signals. The following allocation applies:

| Bit 0 | Output 1 |
| Bit 1 | Output 2 |
| .     | .        |
| Bit 15 | Output 16 |

In this way, it is easy to read out the current state of the 16 outputs.

The output module is allocated its own address so that it can be addressed selectively (e.g. for simulating an output signal). The system and station addresses are the same for all modules in a multi-purpose processing station. They are set on the modules jointly and automatically via the station-bus control module.

The module addresses are set automatically by plugging the module into the slot provided within the multi-purpose processing station.

Writing in/reading out of data

Appropriate address information is necessary in the telegram in order to read out the register contents (output and diagnosis data). Table 1 below shows this address information and the contents of the relevant registers for writing in and reading out.

The addresses identified with ‘a’ are freely selectable and depend on the place of installation of the modules.

The module is notified in the operation code of the telegram as to whether it should write in or read out.
### Table 1

<table>
<thead>
<tr>
<th>Write in Source Address Signals</th>
<th>Data Word (Bit Address)</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Information</td>
<td>System</td>
<td>Station Module</td>
</tr>
<tr>
<td>Data Telegram (maximum 16)</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Read Out Address Output Module</th>
<th>Data Word (Bit Address)</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Information</td>
<td>System</td>
<td>Station Module</td>
</tr>
<tr>
<td>Binary Output Words</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Received Data Words (maximum 16)</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Diagnosis Register</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>

**Explanation:**

EBX = Single bit X  
ABX = Binary output X  
DA = Type of data  
BI = Any information  
a = Address freely selectable (depending on place of installation)

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### Annunciation functions

#### Annunciations on the module

Two red light-emitting diodes are provided at the front of the module, and in version R1010 in addition 16 green LEDs. The light-emitting diode SIM emits a steady light as long as one of the output signals is being simulated. The light-emitting diode ST emits a steady light if a disturbance is recognized in the module or if the sink time monitor responds.

Version R1010 of the module additionally incorporates the light-emitting diodes 1 to 16, which are allocated to the 16 binary outputs and which indicate their status. If a LED is set, a “1” signal is present at the corresponding output.

#### Annunciation functions to the station bus

Disturbances during reception, processing or transfer of telegrams are recognized and stored. The signal “Common disturbance Station” is output at the same time. The diagnosis register is then read out from the control system operator station for evaluation.
Function diagram (Version R1010)

Terminal designations: The module consists of two printed circuit boards (see “Mechanical design”). The output printed circuit board is equipped with connectors X1 and X2. Connector X1 includes all process outputs. Connector X2 contains all voltages for this printed circuit board. The processing board is equipped with connector X3. It contains the standard interface to the station—bus and the operating voltages for this printed circuit board.
Connection diagram

Note: Each output can activate each of the permissable loads.

Mechanical design

Board size: 6 units, 2 divisions, 160 mm deep

Connector: to DIN 41 612

- 2 x for station-bus connection, 48-pole, edge-connector type F (connector X2, X3)
- 1 x for process connection, 32-pole, edge-connector type F (connector X1)

Weight: approx. 0.74 kg

Both printed circuit boards are connected with each other mechanically and electrically.
Position of the light-emitting diodes on the output printed circuit board and front panel (R1010)

Explanation:

1 = Output printed circuit board

2 = Processing printed circuit board
Position of plug-in memory modules on the processing printed circuit board

Memory modules:

1 = Bus and module program, A308 (EPROM)  
   Order number:  
   (Component)  
   GJT110034P1  
   (2732A)  
   Order number:  
   (PROM programmed)  
   GJR2350301Pxxxx

2 = Bus and module program, A307 (EPROM)  
   GJT110034P1  
   (2732A)  
   GJR2350302Pxxxx

3 = Address PROM (unprogr.), A401 (EPROM)  
   GJT110034P1  
   (2732A)

Note on individual PROMS:
All programmed PROMs required by the module for the basic program and all blank PROMs for the user program are supplied as a set when 81AB01 R00xx is specified in the order. In this case, xx denotes the respective module software version.

Note:
The mounting position of the components is marked by an imprint on the printed circuit board.

xxxx = Item numbers corresponding to the appropriate revision.
Technical data

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

**Power supply**

Operating voltages bus section
- UD+ = + 5 V
- UB+ = +24 V

Operating voltage process section
- US = +24 V

Current consumption
- ID = 1.3 A
- IB = 0.01 A
- IS = 56 mA + (max.) 16 x 100 mA

Power dissipation, typ. (max.)
- PV = 13.5 W

Reference potential bus section
- ZD = 0 V

Reference potential process section
- Z = 0 V

**Input values**

TL – Test input for all outputs
- Ue = 19.5 ... 30 V
- Ie = 1.6 mA (1 NL)

SS – Standard interface Station–bus

**Output values**

AB1... – Binary signal outputs
- UA ≥ US – 3.5 V

AB16 Short-circuit-proof to US and Z
- Ia = 100 mA

Provided with quenching diode

Z1... – Reference conductor for two-pole

Z15/16 connected binary signals

**ORDERING DATA**

1. Complete module:
   - Type designation: 81AB01–E/R1010
   - Order number: GJR2342600R1010
   - 81AB01–E/R1110
   - GJR2342600R1110

2. Memory modules: see “Mechanical design”

Technical data are subject to change without notice!