Application

The input module for resistance values is used to connect resistance thermometers PT 100 to DIN 43760 or potentiometric transmitters.

The module contains 16 function units and requires an address range of 32 consecutive addresses on the 10-bus.

Thus, it is possible to connect up to 16 resistance thermometers or up to 16 potentiometric transmitters in four-wire arrangement.

Potential isolation is provided between the analog section and the digital section.

The module is available in 5 different hardware versions:

81 EW10-E/R0100 - for a measuring range of -50 °C ... +150 °C
81 EW10-E/R0200 - for a measuring range of 0 °C ... +150 °C
81 EW10-E/R0300 - for a measuring range of 0 °C ... +300 °C
81 EW10-E/R0400 - for a measuring range of 0 °C ... +600 °C
81 EW10-E/R0500 - for a measuring range of 0 Ohm ... 150 Ohm

The individual versions are generated by modification of the inverted components.

Versions R0100 ... R0400 are used to connect resistance thermometers according to DIN 43760.

Version R0500 is used to connect potentiometric transmitters.

Features

The module can be plugged into every multi-purpose processing station of the PROCONTROL bus system and has a slot requirement of 2 divisions.

It incorporates a standard interface SEA to the 10-bus.

The module receives the analog signals from the resistance thermometers or potentiometric transmitters installed in the process and transfers the values in the form of telegrams via the 10-bus to the PROCONTROL bus system.

The measured value inputs are cyclically scanned by a relay multiplexer and monitored for open circuit.

Important:

It is essential to insert the module for only parts of its length in the subrack and to leave it in this position for at least 30 s before the operating voltage is applied (by plugging it fully into the mating bus and process connectors).

To avoid any disturbances it is necessary to allow the mercury relays used on the module to assume a defined state.

Important:

In connection with the bus coupling module 88 QT02, only the versions R0200, R0300, R0400 and R0500 can be used.
Description

Basically, the module consists of three functional blocks:

- Acquisition of analog values by means of the relay multiplexer and conversion to digital values.
- Sequential control of signal acquisition and filing of the digitized measured value in a memory.
- Bus adaption with output of the filed measured value when the module is called.

The hardware is subdivided into an analog and a digital section, in which the tasks of the three functional blocks are performed.

ANALOG SECTION

The resistance thermometers or potentiometric transmitters are connected to the measured value inputs on a four-wire basis.

A constant current of 2 mA flows while the individual function units are scanned.

The analog section performs the following functions:

- Generation of the constant current of 2.0 mA.
- Measurement of the voltage at the measuring point via a high resistance.
- Detection of an open circuit condition at the process inputs.
- Conversion of the resistance value of the resistance thermometers or potentiometric transmitters to a proportional frequency.

DIGITAL SECTION

In the digital section of the module, sequential control for signal acquisition, signal conversion and 10-bus adaption are implemented.

The digital section performs the following functions:

- Energization of the relays of the 16 function units for a period of 100 ms in a 1.6 s cycle.
- Formation of the measuring time of 40 ms for the individual measured values.
- Conversion of the respective measuring frequency of the individual function units into a digital value of 11 bit word length, and storage in the relevant measured value register of the measured value memory.
- Recognition of its own module address by comparing the incoming address telegram with the address set on the module by means of hex. code switches.
- Transfer of the serial measured value telegram of the function unit called by an address telegram from the measured value memory to the 10-bus.
- Recognition of specification telegram addressing and subsequent output of the respective specification telegram to the 10-bus.
- Scanning of switches S6 and S7 for unused function units and output of values 0 %, if necessary.
- Formation of disturbance annunciation SME and activation of the red light-emitting diode ST for disturbance annunciation situated on the front panel of the module.
- Setting of the disturbance bit in the measured value telegram of the respective function units.

SIGNAL INPUT FROM THE PROCESS

The measured values are conditioned in common for all function units. They are switched by a relay multiplexer in sequence to the measuring equipment and then supplied to an amplifier.
The output signal of the amplifier is fed to a frequency/digital converter via a voltage/frequency converter and a potential isolating facility.

This converter forms a 13 bit data word (11 bits for measured value + sign + disturbance bit), which is transferred as data telegram to the IO-bus system when requested by the processing station.

The measured value is represented digitally as a percentage of the corresponding measuring range, as follows:

```
   14 13 12 11 10 9 8 7 6 5 4
            0,097.. %
             0,195.. %
              0,390.. %
               0,781.. %
                1,562.. %
                 3,125 %
                  6,25 %
                   12,5 %
                    25 %
                     50 %
                     100 %
```

Adding the bits set to logic "1" yields the analog measured variable.

The module receives up to 16 measured values via its two process connectors X3 and X4.

**WIRING OF UNUSED FUNCTION UNITS**

It is not necessary to wire unused function units.

When unused inputs are scanned, a digital measured value of 0% is output.

Function units which are not used are preset via the configuration switches S6 and S7.

**DATA OUTPUT TO THE IO-BUS**

Whenever the module is called by its module starting address, it transfers the contents of its measured value memory to the IO-bus in the form of data telegrams.

The module additionally transfers the specification telegram pertaining to each data telegram.
Formation of telegrams

Two telegrams are formed by the module for each function unit and transferred to the IO-bus. For this, 32 consecutive addresses are needed on the IO-bus.

DATA TELEGRAM

The data telegram has a length of 16 bits, with the contents specified below.

It is output under the even-numbered address.

<table>
<thead>
<tr>
<th>15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure value 12 bits</td>
</tr>
<tr>
<td>Disturb. bit</td>
</tr>
<tr>
<td>Sign</td>
</tr>
<tr>
<td>0 = positive</td>
</tr>
<tr>
<td>1 = negative</td>
</tr>
</tbody>
</table>

Of the 12 bits provided for the measured value, the first 11 bits are used to show the entire measuring range. Bit 3 is not used for evaluation.

SPECIFICATION TELEGRAM

Details on the type of transmitter as well as on the start and end of the set measuring range are additionally output by the module for every data telegram.

The specification telegram is output to the next odd-numbered address of the preceding data telegram.

The specification telegram is subdivided as follows and is set by means of the configuration switches S4 and S5:

<table>
<thead>
<tr>
<th>15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of measuring range</td>
</tr>
<tr>
<td>End of measuring range</td>
</tr>
<tr>
<td>Transmitter type</td>
</tr>
</tbody>
</table>
Data communication with the module

The module is provided on its front with 2 hex. code address switches which serve to set the module starting address.

The 3rd hex. code address switch necessary for complete addressing is permanently wired on the module to 0; it contains the least significant bit (LSB) of the module address.

The position of switch S3 is marked by 0 impressed on the module front below the cut-outs for switches S1 and S2.

When the module is called by its starting address defined by the hex. code address switches, it transfers its data and specification telegrams to the IO-bus during the following 32 transfer cycles.

When the module is called by an address telegram by its module starting address, it transfers the data telegram of its first function unit during the next transfer cycle.

The 31 subsequent addresses of the remaining function units are recognized module internally and transferred to the IU-bus during the following transfer cycles.

FORMATION OF ADDRESS

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

In the module every incoming address telegram is compared with its own module starting address. This comparison takes place in parallel mode.

Address comparison takes place by means of the following bit positions in connection with the hex. code address switches:

After bit positions 5 to 11 have been evaluated (on the basis of the wired bits of the hex. code switches S1 and S2) and the transferred address agrees with the module starting address, evaluation of the total address telegram is made. By this complete address telegram, the data telegram of the respective function unit is triggered and then transferred.

The complete address telegram has the following format:

```
<table>
<thead>
<tr>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

- Specification (0 or 1)
- Wired bits of the module starting address
- Parity bit always 000

When the address is the same, a check for odd parity and for assignment of 0 to bit positions 13 to 15 is performed.

The measured value memories of the individual function units are addressed directly via the bit positions 1 to 4.

The 0 address bit is the so called specification bit. Depending on the state of the specification bit, a specification telegram or a data telegram is transferred.

0 = data telegram
1 = specification telegram
Annunciation functions

Disturbances in the module, in the process peripherals 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 three ways:

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

- Annunciation via bus line SME of the IO-bus

- Annunciation by setting the disturbance bit SB in the data telegram of the corresponding function unit.

ANNUNCIATION TO THE MODULE

The red light-emitting diode ST is connected with bus line SME. It emits a steady light signal when a disturbance annunciation is transferred via bus line SME.

ANNUNCIATION TO THE IO-BUS

A disturbance annunciation is output in the following cases:

- If the module is not addressed by a valid address telegram within 7 s.

  Disturbance 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 after 200 ms.

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

  Disturbance signal SME and light-emitting diode ST are set as long as the disturbances are present.
  After the disturbances have been removed SME and ST are reset after 200 ms.

- If disturbances occur in the internal sequential cycle, e.g. in the measured value memory allocation.

  Disturbance signal SME and light-emitting diode ST are set as long as the disturbances are present.
  After the disturbances have been removed SME and ST are reset after 200 ms.

- If one or more function units have an open circuit at the process inputs.

  Disturbance bit SB in the corresponding data telegram is set and value 0 is output.

  In addition, disturbance signal SME and the light-emitting diode ST are set.

  The period for which the disturbance bit is output is dependent on jumper 1008.

- If one or more function units are supplied with a measured value which exceeds the measuring range by 150 % or falls below the measuring range by -50 %.

  The disturbance bit is set in the respective data telegram of the function unit.
Data communication with the module

The module is provided on its front with 2 hex. code address switches which serve to set the module starting address.

The 3rd hex. code address switch necessary for complete addressing is permanently wired on the module to 0; it contains the least significant bit (LSB) of the module address.

The position of switch S3 is marked by 0 imprinted on the module front below the cut-outs for switches S1 and S2.

When the module is called by its starting address defined by the hex. code address switches, it transfers its data and specification telegrams to the 10-bus during the following 32 transfer cycles.

When the module is called by an address telegram by its module starting address, it transfers the data telegram of its first function unit during the next transfer cycle.

The 31 subsequent addresses of the remaining function units are recognized module internally and transferred to the 10-bus during the following transfer cycles.

FORMATION OF ADDRESS

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

In the module every incoming address telegram is compared with its own module starting address. This comparison takes place in parallel mode.

Address comparison takes place by means of the following bit positions in connection with the hex. code address switches:

After bit positions 5 to 11 have been evaluated (on the basis of the wired bits of the hex. code switches S1 and S2) and the transferred address agrees with the module starting address, evaluation of the total address telegram is made.

By this complete address telegram, the data telegram of the respective function unit is triggered and then transferred.

The complete address telegram has the following format:

The 0 address bit is the so called specification bit. Depending on the state of the specification bit, a specification telegram or a data telegram is transferred.

0 = data telegram
1 = specification telegram
Setting of the module

The settings on the module are performed using the address switches S1 and S2, configuration switches S4, S5, S6 and S7, as well as the potentiometers U6 (lower limit value = R277) and U6 (upper limit value = R224).

SETTING OF ADDRESS

The module starting address is set by means of the address switches S1 and S2.

The address is set with the module withdrawn.

The 3rd address switch is permanently wired in the module. The position of the 3rd address switch S3 is marked by 0 imprinted on the module front below the cut-outs for switches S1 and S2.

Possible settings of the hex. code address switches:

<table>
<thead>
<tr>
<th>Vers.</th>
<th>Meas. range</th>
<th>Switch positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>RO100</td>
<td>-50°C...150°C</td>
<td>S4 : 1 : 2 : 3 : 4 : 5 : 6 : 7 : 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S5 ON</td>
</tr>
<tr>
<td>RO200</td>
<td>0°C...150°C</td>
<td>S4 : 1 : 2 : 3 : 4 : 5 : 6 : 7 : 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S5 ON</td>
</tr>
<tr>
<td>RO300</td>
<td>0°C...300°C</td>
<td>S4 : 1 : 2 : 3 : 4 : 5 : 6 : 7 : 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S5 ON</td>
</tr>
<tr>
<td>RO400</td>
<td>0°C...600°C</td>
<td>S4 : 1 : 2 : 3 : 4 : 5 : 6 : 7 : 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S5 ON</td>
</tr>
<tr>
<td>RO500</td>
<td>0 Ohm...150 Ohm</td>
<td>S4 : 1 : 2 : 3 : 4 : 5 : 6 : 7 : 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S5 ON</td>
</tr>
</tbody>
</table>

Other settings are not accepted by the module. In this case, the module outputs a disturbance announcement SME after 7 s and signals a disturbance via light-emitting diode S1.

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

If the module is used in connection with a bus coupling module 88 QT02, value 1 must be set on address switch S1.

By setting the 1st address switch to "1", the bus coupling module 88 QT02 is notified that specification telegrams are transferred by the module.

MEANING OF THE CONFIGURATION SWITCHES

The specification telegram is set by means of configuration switches S4 and S5.

The setting should appear as follows, according to the 5 module versions.
It is not possible to convert a version only by modification of switch contacts.

To convert the version, it is additionally necessary to re-arrange the resistors in the analog value processing unit, and the module must also be calibrated.

The individual function units can be preselected individually by means of configuration switches S6 and S7.

When scanning unused function units, a digital measured value of 0 % is output.

The allocation of the individual function units to the switch contacts of configuration switches S6 and S7 is shown in the following diagram.

- For used function units, the corresponding switch contact of configuration switch S6 or S7 should be set to position ON.

- For unused function units, the corresponding switch contact of configuration switch S6 or S7 should be set to position OFF.

- Contact position ON is provided with the imprint ON on the configuration switch. The unmarked contact position is the contact position OFF.

- Inputs marked as unused by the configuration switches S6 and S7 must not be connected, since this could produce an illegal digital measured value.
Calibration of module

Potentiometers are provided on the module to allow calibration of the lower and upper limit values of the analog inputs.

Calibration is performed on function unit 1 simultaneously for all function units.

It is done on the frequency/digital converter, and applies for the version concerned.

There are two possibilities for calibrating the module.

CALIBRATION POSSIBILITY 1

Module calibration by means of a frequency meter:

Two minitermipoint test pins f₀ and f₁ are provided on printed circuit board (1) for measuring the frequency, (see “Mechanical design”).

The frequency measurement must be made with the aid of a frequency counter with a 1u:1 sensing head, between f₁ and f₀.

The calibration accuracy to be achieved is: +/-15 Hz (+/-1 LSB).

CALIBRATION POSSIBILITY 2

Module calibration by considering the data telegram of the 1st function unit:

Instead of a frequency counter a binary output module is used to observe the output of the first function unit of the module to be calibrated.

ADJUSTMENT OF UPPER AND THE LOWER LIMIT VALUES

The procedure is the same for all module versions.

The resistance value intended for the module version must be connected to voltage inputs U11 and U12 of the 1st function unit.

Calibration resistances of module versions R0100 to R0500:

<table>
<thead>
<tr>
<th>Module version</th>
<th>0 % - Value</th>
<th>100 % - Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T/°C</td>
<td>R/Ohm</td>
</tr>
<tr>
<td>R0100</td>
<td>-50</td>
<td>80.25</td>
</tr>
<tr>
<td>R0200</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>R0300</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>R0400</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>R0500</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

Contacts U11 and IK11, as well as U12 and IK12 of the 1st function unit have to be bridged for calibration.

Calibration is performed on the potentiometers upper limit value (UΩ = R227) and lower limit value (UΩ = R224).
Calibration procedure

- Install jumper 1007.

- Connect the calibration resistance specified in the table for the 0 %-value of the appropriate version to the bridged contacts of the 1st function unit.

- Using potentiometer UG (R224), set the 0 %-value to a frequency of 51.190 kHz +/-15 Hz, \( f_1 \) with respect to \( f_0 \), between the two measuring points (according to calibration possibility 1).

or calibrate the data telegram of the 1st function unit to:

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

(according to calibration possibility 2)

- Connect the calibration resistance specified in the table for the 100 %-value of the appropriate version to the connected contacts of the 1st function unit.

- Using the potentiometer UG (R227), set the 100 %-value to a frequency of 162.390 kHz +/-15 Hz, \( f_1 \) with respect to \( f_0 \), between the two measuring points (according to calibration possibility 1)

or calibrate the data telegram of the 1st function unit to:

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

(according to calibration possibility 2)

- Repeat the calibration sequence for 0 %-value and 100 %-value once.

- Remove jumper 1007.

If the calibration range of the 0 %-value potentiometer is not sufficient for setting the frequency of 51.190 kHz, the resistance on mounting place 1001 should be changed (proceed for calibration possibility 2 in the same way).

- If \( f_1 \) is greater than 51.190 kHz, a smaller resistance must be chosen for mounting place R1001.

- If \( f_1 \) is smaller than 51.190 kHz, a larger resistance must be chosen for mounting place R1001.
Functional diagram

The module consists of two printed circuit boards (see "Mechanical design"), which are equipped with four connectors X1, X2, X3 and X4, two address switches S1 and S2, the configuration switches S4, S5, S6, S7 as well as the potentiometer UG for the lower and OG for the upper measuring range limit.

Terminal designations:

The printed circuit board (1) is equipped with connectors X1 and X3. Connector X1 contains the standard interface to the IO-bus SEA. Connector X3 contains 8 process inputs.

The printed circuit board (2) is fitted with the connectors X2 and X4. Connector X2 contains part of the standard interface to the IG-bus SEA. Connector X4 contains the remaining 8 process inputs.
Connection diagram

The connections of the module version R0100, R0200, R0300, R0400 and R0500 are the same.

81 EW10-E

IO-BUS
Mechanical design

The mechanical design is the same for all module versions.

Board size: 6 U, 2 T, 160 mm deep

Connector:
- to DIN 41 612
- 2 x for IG-bus connection
  - 48-pole, Edge connector type F
    (connector X1, X2)
- 2 x for process connection
  - 32-pole, Edge connector type F
    (connector X3, X4)

Weight: approx. 0.84 kg

The printed circuit boards (1) and (2) are connected with each other mechanically and electrically.

The exact contact allocation of the individual connectors can be seen from the operating principles description "Connectors of the IG-bus modules" GKWE 705 321 or the function diagram of the module.
The front panels of the module versions R0100, R0200, R0300, R0400 and R0500 as well as the functions of the components shown are the same.

Light-emitting diode for disturbance annunciation ST
Upper limit of the measuring range
Lower limit of the measuring range

IO-bus address

<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>

The switch S3 is permanently wired to 0 and shown as imprint on the front of the module.
POSITIONS OF THE ADJUSTABLE COMPONENTS ON PRINTED CIRCUIT BOARD (1)

The printed circuit board contains the two address switches S1 and S2 for setting the module starting address, as well as connectors X1 for the IO-bus connection and X3 for the connection of the first 8 function units. The 3rd address switch S3 is permanently wired to 0.

Status of the jumpers on the printed circuit board:

<table>
<thead>
<tr>
<th>Version</th>
<th>RO100</th>
<th>RO200</th>
<th>RO300</th>
<th>RO400</th>
<th>RO500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumper: 1008</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
</tr>
<tr>
<td>1009</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
</tr>
<tr>
<td>1010</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
</tr>
<tr>
<td>1011</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
</tr>
<tr>
<td>1012</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
<td>in place</td>
</tr>
</tbody>
</table>

81 EW10-E
POSITIONS OF THE ADJUSTABLE COMPONENTS ON PRINTED CIRCUIT BOARD (2)

The printed circuit board contains the two potentiometers UG (R224) and OG (R227) for setting the limit values to 0 % and 100 %. For calibration of the frequency, the two measuring points f₀ and f₁ are designed as minitermipoint test pins.

The configuration switches S₄ and S₅ include the contacts for setting the specification telegram. The configuration switches S₆ and S₇ are used to preselect the function units.

The printed circuit board also contains the connectors X₂ and X₄ as well as resistor mounting places 1001 to 1006 and jumper 1007 for calibration purposes.
Technical data

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

MODULE VERSION: R0100 ... R0500

POWER SUPPLY

Rated voltage: 19.5 ... 30 V
Operating voltage US: 24 V
Current consumption I_{typ}: 200 mA
Power dissipation P_{vtyp}: 4.8 W

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

Reference potential IO-bus Z: 0 V

TRANSFER

Multiplexer: Relay multiplexer via coupling relays with contact current 2.0 mA
Data conversion: Analog/frequency conversion and Frequency/digital conversion
Cycle time for all inputs: 1.6 s
Measuring time per input: 100 ms

INPUTS

Number of the resistance thermometers to be connected: 16
Input type: Differential inputs
Input designation: IK11 - IK162, U11 - U162
Input values
Module version R0100: -50 °C ... 150 °C
Module version R0200: 0 °C ... 150 °C
Module version R0300: 0 °C ... 300 °C
Module version R0400: 0 °C ... 600 °C
Module version R0500: 0 Ohm ... 150 Ohm

OUTPUTS

Output designation: SEA standard interface IO-bus
### ERROR SPECIFICATION

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Module</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linearity error</td>
<td>R0100:</td>
<td>+/-0.035 % typ. (+/-0.070 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0200:</td>
<td>+/-0.040 % typ. (+/-0.074 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0300:</td>
<td>+/-0.034 % typ. (+/-0.067 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0400:</td>
<td>+/-0.032 % typ. (+/-0.064 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0500:</td>
<td>+/-0.033 % typ. (+/-0.065 % max.)</td>
</tr>
<tr>
<td>Temperature error</td>
<td>R0100:</td>
<td>+/-0.1 % typ. (+/-0.18 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0200:</td>
<td>+/-0.13 % typ. (+/-0.24 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0300:</td>
<td>+/-0.09 % typ. (+/-0.14 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0400:</td>
<td>+/-0.06 % typ. (+/-0.1 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0500:</td>
<td>+/-0.06 % typ. (+/-0.1 % max.)</td>
</tr>
<tr>
<td>Total error</td>
<td>R0100:</td>
<td>+/-0.13 % typ. (+/-0.25 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0200:</td>
<td>+/-0.17 % typ. (+/-0.31 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0300:</td>
<td>+/-0.12 % typ. (+/-0.21 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0400:</td>
<td>+/-0.09 % typ. (+/-0.16 % max.)</td>
</tr>
<tr>
<td></td>
<td>R0500:</td>
<td>+/-0.09 % typ. (+/-0.16 % max.)</td>
</tr>
</tbody>
</table>

Effect of supply voltage variations: none at 24 V +/-30 % supply voltage
Common-mode rejection: 60 dB
Series-mode rejection, typ.: Cut-off frequency 25 Hz
Suppression at cut-off frequency $f_0 = 3$ dB
Increase of 20 dB per decade $f/f_0$

### PERMISSIBLE TEMPERATURE RANGES

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

### ORDERING DATA

- Complete module:
  - Type designation: b1 EW10-E/R0100
  - Order number: GJJK2357200K0100
  - b1 EW10-E/R0200
  - Order number: GJJK2357200R0200
  - b1 EW10-E/R0300
  - Order number: GJJK2357200R0300
  - b1 EW10-E/R0400
  - Order number: GJJK2357200R0400
  - b1 EW10-E/R0500
  - Order number: GJJR2357200R0500

Technical data are subject to change without notice.