System Description

ABB Procontic K200
Family of Compact
Programmable Controllers

Hardware

ABB Schalt- und Steuerungstechnik
Regulations
Concerning the Setting up of Installations

Apart from the basic "Regulations for the Setting up of Power Installations" DIN VDE* 0100 and for "The Rating of Creepage Distances and Clearances" DIN VDE 0110 Part 1 and Part 2 the regulations "The Equipment of Power Installations with Electrical Components" DIN VDE 0160 in conjunction with DIN VDE 0660 Part 500 have to be taken into due consideration.

Further attention has to be paid to DIN VDE 0113 Part 1 and Part 200 in case of the control of working and processing machines. If operating elements are to be mounted near parts with dangerous contact voltage DIN VDE 0106 Part 100 is additionally relevant.

If the protection against direct contact according to DIN VDE 0160 is required, this has to be ensured by the user (e.g. by incorporating the elements in a switch-gear cabinet). The devices are designed for pollution severity 2 in accordance with DIN VDE 0110 Part 1. If higher pollution is expected, the devices must be installed in appropriate housings.

The user has to guarantee that the devices and the components belonging to them are mounted following these regulations. For operating the machines and installations, other national and international relevant regulations, concerning prevention of accidents and using technical working means, also have to be met.

The ABB Procontic devices are designed according to IEC 1131 Part 2. Meeting this regulation, they are classified in overvoltage category II which is in conformance with DIN VDE 0110 Part 2.

For the direct connection of ABB Procontic devices, which are powered with or coupled to AC line voltages of overvoltage category III, appropriate protection measures corresponding to overvoltage category II according to IEC-Report 664/1980 and DIN VDE 0110 Part 1 are to install.

Equivalent standards:

DIN VDE 0110 Part 1 = IEC 664
DIN VDE 0113 Part 1 = EN 60204 Part 1
DIN VDE 0660 Part 500 = EN 60439-1 = IEC 439-1

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* VDE stands for "Association of German Electrical Engineers".

ABB Schalt- und Steuerungstechnik GmbH Heidelberg
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1 Introduction

1.1 General

The compact controllers of the system family ABB Proconic K200 are available in various basic configurations from 20 I/Os to 64 I/Os. The system can be extended up to a maximum of 128 I/Os with various input and/or output modules.

The system can:
- execute binary logic functions (AND/OR ...)
- store
- generate times
- count.

Special function blocks such as:
- Shift register (16 bit)
- memory with dynamic inputs
- jump commands
- comparators are already installed.

The system is programmed by means of a high-performance miniature programming unit.

This provides the following functions:
- Setting of outputs
- Displaying the status of I/Os
- Changing the program to times and counter values during processing
- Continuity checking of wiring
- Storing of programs on cassette
- Diagnostic functions

Programming with an IBM Personal Computer or a compatible Personal Computer is also possible via a special interface.

Various program memory modules (EPROM, EEPROM) which are plugged in from the front permit rapid replacement of user programs. The use of EEPROMs makes buffer batteries unnecessary.

1.2 General overview address allocation

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<th>Designation</th>
<th>Number</th>
<th>Type</th>
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<td>Inputs Basic configuration</td>
<td>000–007</td>
<td>KR220</td>
</tr>
<tr>
<td></td>
<td>010–013</td>
<td></td>
</tr>
<tr>
<td></td>
<td>010–017</td>
<td>KR228</td>
</tr>
<tr>
<td></td>
<td>020–027</td>
<td>KT228</td>
</tr>
<tr>
<td></td>
<td>030–037</td>
<td>KR240</td>
</tr>
<tr>
<td></td>
<td>040–047</td>
<td>KT240</td>
</tr>
</tbody>
</table>

| Outputs Basic configuration | 050–057 | KR220 |
|                            | 060–063 | KR228 |
|                            | 060–067 | KR240 |
|                            | 070–077 | KR264 |

| Input expansions | 100–107                    |
|                 | 110–117                    |
|                 | 120–127                    |
|                 | 130–137                    |
|                 | 140–147                    |
|                 | 150–157                    |
|                 | 160–167                    |
|                 | 170–177                    |
|                 | 200–207                    |
|                 | 210–217                    |
|                 | 220–227                    |
|                 | 230–237                    |
|                 | 240–247                    |
|                 | 250–257                    |
|                 | 260–267                    |
|                 | 270–277                    |
|                 | 300–307                    |
|                 | 310–317                    |
|                 | 320–327                    |
|                 | 330–337                    |
|                 | 340–347                    |
|                 | 350–357                    |
|                 | 360–367                    |
|                 | 370–377                    |

| Output expansions | 200–207                    |
|                  | 210–217                    |
|                  | 220–227                    |
|                  | 230–237                    |
|                  | 240–247                    |
|                  | 250–257                    |
|                  | 260–267                    |
|                  | 270–277                    |
|                  | 300–307                    |
|                  | 310–317                    |
|                  | 320–327                    |
|                  | 330–337                    |
|                  | 340–347                    |
|                  | 350–357                    |
|                  | 360–367                    |
|                  | 370–377                    |

| 128 unbuffered flags | 400–407                    |
|                      | 410–417                    |
|                      | 420–427                    |
|                      | 430–437                    |
|                      | 440–447                    |
|                      | 450–457                    |
|                      | 460–467                    |
|                      | 470–477                    |
|                      | 500–507                    |
|                      | 510–517                    |
|                      | 520–527                    |
|                      | 530–537                    |
|                      | 540–547                    |
|                      | 550–557                    |
|                      | 560–567                    |
|                      | 570–577                    |
|                      | 600–607                    |
|                      | 610–617                    |
|                      | 620–627                    |
|                      | 630–637                    |
|                      | 640–647                    |
|                      | 650–657                    |
|                      | 660–667                    |
|                      | 670–677                    |
|                      | 700–707                    |
|                      | 710–717                    |
|                      | 720–727                    |
|                      | 730–737                    |
|                      | 740–747                    |
|                      | 750–757                    |
|                      | 760–767                    |
|                      | 770–777                    |

| 248 buffered flags  | 400–407                    |
|                     | 410–417                    |
|                     | 420–427                    |
|                     | 430–437                    |
|                     | 440–447                    |
|                     | 450–457                    |
|                     | 460–467                    |
|                     | 470–477                    |
|                     | 500–507                    |
|                     | 510–517                    |
|                     | 520–527                    |
|                     | 530–537                    |
|                     | 540–547                    |
|                     | 550–557                    |
|                     | 560–567                    |
|                     | 570–577                    |
|                     | 600–607                    |
|                     | 610–617                    |
|                     | 620–627                    |
|                     | 630–637                    |
|                     | 640–647                    |
|                     | 650–657                    |
|                     | 660–667                    |
|                     | 670–677                    |
|                     | 700–707                    |
|                     | 710–717                    |
|                     | 720–727                    |
|                     | 730–737                    |
|                     | 740–747                    |
|                     | 750–757                    |
|                     | 760–767                    |
|                     | 770–777                    |

| 8 special functions | 770–777                    |

| 40 timers          | T00–T07                    |
|                   | T10–T17                    |
|                   | T20–T27                    |
|                   | T30–T37                    |
|                   | T40–T47                    |

| 24 down counters   | 250–257                    |
|                   | 260–267                    |
|                   | 270–277                    |
Note: The maximum configuration of the system (80 I, 48 O) can only be achieved with use of the 07 KR 264 unit. If smaller basic configurations are used the number of input/output channels is reduced correspondingly.

Example: Basic configuration 07 KR 228: 16 I, 12 O
Expansion module 07 EA 264: 40 I, 24 O
Total: 56 I, 36 O

Basic configuration 07 KR 220: 12 I, 8 O
and I/O modules, max. 40 I, 24 O
total max. 52 I, 32 O
Can be realized with one basic configuration (07 KR 220) plus 5 EB XXX and 3 AB XXX (XXX = 200 or 205).

Note 1:
If instead of the expansion modules 07 EA 240 or 07 EA 264 I/O modules of the types 07 EB 200, 07 EB 205, 07 AB 200 or 07 AB 205 are used the address numbers of the I/O channels are determined by the components used.

Example:

<table>
<thead>
<tr>
<th>07 KR 228</th>
<th>07 EB 200</th>
<th>07 AB 200</th>
<th>07 AB 205</th>
<th>etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100–107</td>
<td>110–117</td>
<td></td>
<td>120–127</td>
<td></td>
</tr>
</tbody>
</table>

The first module in addition to the basic configuration occupies the address range 100–107, the second module 110–117, etc. regardless of whether it is an input or output module. The maximum configuration is 80 inputs/48 outputs. Output channels not occupied by hardware can be used in the program as additional flags.

Example: If the basic configuration 07 KR 228 is used the outputs 064 to 077 and 100 to 177 are available as unbuffered flags in addition.

Remark: Addressing of the ABB Procontic K200 follows an octal pattern. Only the numbers 0–7, 10–17, 20–27 etc. are allowable.

Note 2:
For buffering a built-in gold capacitor is used. The buffer time is approx. 2 weeks.
In Section 2 the technical data of the ABB Procon- tic K200 basic configurations listed below are stated:

07 KR 220 R1
07 KR 220 R2
07 KR 220 R3
07 KR 228 R1
07 KR 228 R3
07 KT 228 R1
07 KR 240 R1
07 KR 240 R2
07 KR 240 R21
07 KR 240 R3
07 KT 240 R1
07 KR 264 R1
07 KR 264 R2
07 KR 264 R3

A schematic diagram explains the pin configuration.

DIN VDE 0160 §7.2.2 (mechanical resistance) applies
to all ABB Proconic K200 basic configurations.
2.1 Basic configuration 07 KR 220 R1

2.1.1 Technical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Number of inputs</td>
<td>12</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>8</td>
</tr>
<tr>
<td>can be expanded with integrated user program memory</td>
<td>max. 64 I/O points</td>
</tr>
<tr>
<td>externally plugged for program storage</td>
<td>1 K EEPROM (950 words)</td>
</tr>
<tr>
<td>Cycle time (bit)</td>
<td>2 K EEPROM or 2 K EPROM (1970 words)</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>typically 5 ms/K instructions</td>
</tr>
<tr>
<td>Power consumption</td>
<td>230 V AC (+ 15%, - 25%) 50/60 Hz</td>
</tr>
<tr>
<td>Supply voltage of inputs</td>
<td>22 VA without programming unit</td>
</tr>
<tr>
<td>Input data</td>
<td>24 V DC, integrated (max. 0.4 A)</td>
</tr>
<tr>
<td></td>
<td>Inputs isolated via optocouplers</td>
</tr>
<tr>
<td></td>
<td>Input delay typically 4 ms</td>
</tr>
<tr>
<td></td>
<td>Input current typically 10 mA</td>
</tr>
<tr>
<td>Output data</td>
<td>Relay outputs 230 V AC, $\cos \varphi = 1$: $I_{\text{max}} = 2$ A</td>
</tr>
<tr>
<td></td>
<td>230 V AC, $\cos \varphi = 0.4$: $I_{\text{max}} = 1$ A</td>
</tr>
<tr>
<td></td>
<td>230 V DC/24 V DC: $I_{\text{max}} = 1$ A</td>
</tr>
<tr>
<td></td>
<td>230 V AC/24 V AC, $I_{\text{max}} = 1$ A</td>
</tr>
<tr>
<td></td>
<td>230 V DC/24 V DC: $I_{\text{min}} \geq 25$ mA</td>
</tr>
<tr>
<td>Contact service life</td>
<td>Contacts protected by varistor when switching inductive loads</td>
</tr>
<tr>
<td></td>
<td>Output delay typically 10 ms</td>
</tr>
<tr>
<td>Connections</td>
<td>unloaded: $&gt; 20 \times 10^6$ switching cycles</td>
</tr>
<tr>
<td>Time range</td>
<td>loaded 230 V AC/2A: $&gt; 2 \times 10^5$ switching cycles</td>
</tr>
<tr>
<td>Down counters (24)</td>
<td>0.01 – 999 s</td>
</tr>
<tr>
<td>Up/down counters</td>
<td>16, 3 decades each – 8, 4 decades each</td>
</tr>
<tr>
<td>High-speed upward counter</td>
<td>8, 4 decades each</td>
</tr>
<tr>
<td>LED display</td>
<td>1, with 4 decades – 10 kHz</td>
</tr>
<tr>
<td>Flags</td>
<td>for inputs/outputs and operating modes</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>376 (including 248 buffered flags)</td>
</tr>
<tr>
<td>Programming</td>
<td>Cycle monitoring, programming error and checksum by means of programming unit</td>
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<tr>
<td>Permissible temperature range</td>
<td>with miniature programming unit, with IBM PC or compatible PC via 07 PG 201</td>
</tr>
<tr>
<td>Humidity class</td>
<td>0 °C ... 55 °C in operation</td>
</tr>
<tr>
<td>Dimensions</td>
<td>- 10 °C ... 65 °C storage</td>
</tr>
<tr>
<td></td>
<td>90% without condensation</td>
</tr>
<tr>
<td></td>
<td>190 L x 140 H x 102 W</td>
</tr>
</tbody>
</table>

2.1.2 Connection examples

Figure 2.1: Alternating current loads

Figure 2.2: Direct current loads
Demagnetization with Zener diode and diode a or diode b directly at the load
2.1.3 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the basic configuration 07 KR 220 R1.

![Diagram of terminal assignments](image)

**Figure 2.3: Basic configuration 07 KR 220 R1**

1. Input terminals
2. Connection socket for programming unit 07 PG 200 or 07 PG 201
3. High-speed counter
4. Interface for expansion modules (07 EB 200, 07 AB 200, ... etc.)
5. Connection socket for memory modules (07 PR 201/07 PR 210)
6. Output terminals
7. Interface for programming unit 07 PG 200 or 07 PG 201

- 230 V AC = Ground terminal
- STA = start input
- STO = stop input
- RUN = RUN contact
- 24 V DC, 0 V = supply voltage for inputs
- HZ = counting input for high-speed counter
- HR = reset input for high-speed counter
- 00-13 = input terminals
- • = unused terminals
- 50-57 = output terminals (normally open)

For every output channel the two terminals of the normally open contact are brought out to screw terminals.

**LEDs**
- 00-13 = inputs
- 50-57 = outputs
- Mains = mains voltage available
- STA = start signal
- RUN = system running
- HZ = high-speed counter counting
- HR = high-speed counter reset

2.1.4 High-speed counter, 4 decades BCD, 10 kHz

A high-speed counter (10 kHz) is integrated in the hardware of the basic configuration 07 KR 220 R1. This BCD counter is limited to 4 decades (max. counting value 9999).

Both the counting input HZ and the resetting input HR are brought out to screw terminals.

The current value of the counter can be interrogated exclusively with FUN 36 (see section 12.4 of the ABB Proconic K200 software description).
2.2 Basic configuration 07 KR 220 R2

2.2.1 Technical data

Number of inputs
Number of outputs
can be expanded with
Integrated user program memory
externally plugged for program storage
Cycle time (bit)
Supply voltage
Power consumption
Supply voltage of inputs
Input data

Output data

12
8
max. 64 I/O points
1 K EEPROM (950 words)
2 K EEPROM or 2 K EPROM (1970 words)
typically 5 ms/K instructions
230 V AC (+ 15 %, – 25 %) 50/60 Hz
22 VA without programming unit
230 VAC, 1 signal min. 170 VAC, 0 signal max. 60 VAC
Inputs isolated via optocouplers
Input delay typically 16 ms
Input current typically 10 mA

Relay outputs
230 V AC, \(\cos \phi = 1\): \(I_{\text{max.}} = 2\) A
230 V AC, \(\cos \phi = 0.4\): \(I_{\text{max.}} = 1\) A
230 V DC/24 V DC: \(I_{\text{max.}} = 1\) A
230 V AC/24 V AC,
230 V DC/24 V DC: \(I_{\text{min.}} \geq 25\) mA

Contacts protected by varistor when switching
inductive loads
Output delay typically 10 ms
unloaded: \(> 2 \times 10^8\) switching cycles
loaded 230 V AC/2A: \(> 2 \times 10^8\) switching cycles
Screw terminals
40
0.01 – 999 s
16, 3 decades each – 8, 4 decades
8, 4 decades each
1, 4 decades – 10 kHz
for inputs/outputs and operating modes
376 (including 248 buffered flags)
Cycle monitoring, programming error and check sum
by means of programming unit
with miniature programming unit, with IBM PC or
compatible PC via 07 PG 201
0 °C ... 55 °C in operation
– 10 °C ... 65 °C storage
90 % without condensation
190 L x 140 H x 102 W

Notes: The creepage distances and the clearances in air at the inputs met in accordance with
DIN VDE 0160/5.88 and DIN VDE 0109/12.83 the conditions for 115 V AC.

2.2.2 Connection examples

Figure 2.1: Alternating current loads

Figure 2.2: Direct current loads
Demagnetization with Zener diode and
diode a or diode b directly at the load
2.2.3 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the basic configuration 07 KR 220 R2.

Figure 2.6: Basic configuration 07 KR 220 R2

- Input terminals
- Connection socket for programming unit 07 PG 200 or 07 PG 201
- High speed counter
- Interface for expansion modules (07 EB 200, 07 AB 200, ...)
- Connection socket for memory modules (07 PR 201/07 PR 210)
- Output terminals
- Interface for programming unit 07 PG 200 or 07 PG 201
- Ground terminal
- 230 V AC = mains (phase, neutral)
- STA = start input
- STO = stop input
- RUN = RUN contact
- 0 V = supply voltage (24 V DC) for HZ, HR

Drawing of connection:

- 00-13 = input terminals
- Drawing of connection:
- 230 V AC
- C = neutral for 230 V AC inputs
- STA = unused terminal
- Wr/50 = output terminals (normally open)
- Wr/57 = For every output channel the two terminals of the normally open contact are brought out to screw terminals.

- LEDs

| 00-13 | Inputs |
| 50-57 | Outputs |
| Mains | mains voltage present |
| STA   | start signal |
| RUN   | system running |
| HZ    | high-speed counter counting |
| HR    | high-speed counter reset |

2.2.4 High-speed counter, 4 decades BCD, 10 kHz

A high-speed counter (10 kHz) is integrated in the hardware of the basic configuration 07 KR 220 R2. This BCD counter is limited to 4 decades (max. counting value 9999).

Both the counting input HZ and the resetting input HR are brought out to screw terminals.

The current value of the counter can be interrogated exclusively with FUN 36 (see section 12.4 of the ABB Procontic K200 software description).
2.3 Basic configuration 07 KR 228 R1

2.3.1 Technical data

Number of inputs
Number of outputs
Can be expanded with integrated user program memory externally plugged for program storage
Cycle time (bit)
Supply voltage
Power consumption
Supply voltage of inputs
Input data

Output data

Contact service life

Connections
Timers
Time range
Down counters (24)
Up/down counters
High-speed upward counter
LED display
Flags
Diagnosis

Programming

Permissible temperature range

Humidity class

Dimensions

2.3.2 Connection examples

Figure 2.7: Alternating current loads

Figure 2.8: Direct current loads
Demagnetization with Zener diode and diode a or diode b directly at the load
2.3.3 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the basic configuration 07 KR 228 R1.

Figure 2.9: Basic configuration 07 KR 228 R1

1. Input terminals
2. Connection socket for programming unit
   07 PG 200 or 07 PG 201
3. High-speed counter
4. Interface for expansion modules (07 EB 200, 07 AB 200, …)
5. Connection socket for memory modules (07 PR 201/07 PR 210)
6. Output terminals
7. Interface for programming unit 07 PG 200 or 07 PG 201

- Ground terminal
- 230 V AC = mains (phase, neutral)
- STA = start input
- STO = stop input
- RUN contact
- 24 V DC, 0 V = supply voltage for inputs
- HZ = counting input for high-speed counter
- HR = reset input for high-speed counter
- 00–17 = Input terminals
- * = unused terminal
- Wo-W₀ = center contents of relay
- 50–63 = Output terminals (normally open)

LEDs
00–17 = inputs
50–63 = outputs
Mains = mains voltage present
STA = start signal
RUN = system running
HZ = high-speed counter counting
HR = high-speed counter reset

2.3.4 High-speed counter, 4 decades BCD, 10 kHz

A high-speed counter (10 kHz) is integrated in the hardware of the basic configuration 07 KR 228 R1. This BCD counter is limited to 4 decades (max. counting value 9999).

Both the counting input HZ and the resetting input HR are brought out to screw terminals.

The current value of the counter can be interrogated exclusively with FUN 36 (see section 12.4 of the ABB Proconic K200 software description).
### Basic configuration 07 KT 228 R1

#### 2.4.1 Technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inputs</td>
<td>16</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>12</td>
</tr>
<tr>
<td>Type of outputs</td>
<td>Transistor outputs</td>
</tr>
<tr>
<td>can be expanded with</td>
<td>max. 64 I/O points</td>
</tr>
<tr>
<td>Integrated user program memory</td>
<td>1 K EEPROM (950 words)</td>
</tr>
<tr>
<td>externally plugged for program storage</td>
<td>2 K EEPROM or 2 K EPROM (1970 words)</td>
</tr>
<tr>
<td>Cycle time (bit)</td>
<td>typically 5 ms/K instructions</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>230 V AC (+ 15%, – 25%) 50/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>28 VA without programming unit</td>
</tr>
<tr>
<td>Supply voltage of inputs</td>
<td>24 V DC, (integrated max. 0.4 A)</td>
</tr>
<tr>
<td>– Rated value</td>
<td>use only stabilized mains units</td>
</tr>
<tr>
<td>– “0” signal range</td>
<td>for external 24 V DC supply</td>
</tr>
<tr>
<td>– “1” signal range</td>
<td>10 mA</td>
</tr>
<tr>
<td>Input current at “1” signal</td>
<td>13 mA</td>
</tr>
<tr>
<td>typ.</td>
<td>inputs isolated via optocouplers</td>
</tr>
<tr>
<td>max.</td>
<td>Input delay typically 4 ms</td>
</tr>
<tr>
<td>Input data</td>
<td>Input current typically 10 mA</td>
</tr>
<tr>
<td>– rated value</td>
<td>0.5 mA</td>
</tr>
<tr>
<td>– allowable range</td>
<td>10 mA – 0.5 A</td>
</tr>
<tr>
<td>– lamps wattage</td>
<td>max. 5 W</td>
</tr>
<tr>
<td>– total current max.</td>
<td>6 A</td>
</tr>
<tr>
<td>– output delay</td>
<td>typically 1 ms</td>
</tr>
<tr>
<td>Insulation (VDE 160)</td>
<td>1500 V AC</td>
</tr>
<tr>
<td>– against frame</td>
<td>1500 V AC</td>
</tr>
<tr>
<td>– against internals</td>
<td>Screw terminals</td>
</tr>
<tr>
<td>Connections</td>
<td>40</td>
</tr>
<tr>
<td>Timers</td>
<td>0.01 – 999 s</td>
</tr>
<tr>
<td>Time range</td>
<td>16, 3 decades each – 8, 4 decades each</td>
</tr>
<tr>
<td>Down counters (24)</td>
<td>8, 4 decades each</td>
</tr>
<tr>
<td>Up/down counters</td>
<td>1, with 4 decades – 10 kHz</td>
</tr>
<tr>
<td>High-speed upward counter</td>
<td>for inputs/outputs and operating modes</td>
</tr>
<tr>
<td>LED display</td>
<td>376 (including 248 buffered flags)</td>
</tr>
<tr>
<td>Flags</td>
<td>Cycle monitoring, programming error and checksum</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>by means of programming unit</td>
</tr>
<tr>
<td>Programming</td>
<td>with miniature programming unit, with IBM PC or</td>
</tr>
<tr>
<td>Permissible temperature range</td>
<td>compatible PC via 07 PG 201</td>
</tr>
<tr>
<td>Humidity class</td>
<td>0 °C ... 55 °C in operation</td>
</tr>
<tr>
<td>Dimensions</td>
<td>– 10 °C ... 65 °C storage</td>
</tr>
<tr>
<td></td>
<td>90 % without condensation</td>
</tr>
<tr>
<td></td>
<td>190 L x 140 H x 102 W</td>
</tr>
</tbody>
</table>
2.4.2 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the basic configuration 07 KT 228 R1.

![Diagram of basic configuration 07 KT 228 R1]

**Figure 2.10:** Basic configuration 07 KT 228 R1

- **01** Input terminals
- **02** Connection socket for programming unit 07 PG 200 or 07 PG 201
- **03** High-speed counter
- **04** Interface for expansion modules (07 EB 200, 07 AB 200, ...)
- **05** Connection socket for memory modules (07 PR 201/07 PR 210)
- **06** Output terminals
- **07** Interface for programming unit 07 PG 200 or 07 PG 201

- LEDs
  - 00-17 = inputs
  - 50-63 = outputs
  - Mains = mains voltage present
  - STA = start signal
  - RUN = system running
  - HZ = high-speed counter counting
  - HR = high-speed counter reset

2.4.3 High-speed counter, 4 Decades BCD, 10 kHz

A high-speed counter (10 kHz) is integrated in the hardware of the basic configuration 07 KT 228 R1. This BCD counter is limited to 4 decades (max. counting value 9999).

Both the counting input HZ and the resetting input HR are brought out to screw terminals.

The current value of the counter can be interrogated exclusively with FUN 35 (see section 12.4 of the ABB Procontic K200 software description).
2.5 Basic configuration 07 KR 240 R1

2.5.1 Technical data

Number of inputs
Number of outputs can be expanded with
Integrated user program memory externally plugged for program storage
Cycle time (bit)
Supply voltage
Power consumption
Supply voltage of inputs
Input data

Output data

24
16
max. 64 I/O points
1 K EEPROM (950 words)
2 K EEPROM or 2 K EPROM (1970 words)
typically 5 ms/K instructions
230 V~ (+15 %, –25 %) 50/60 Hz
31 VA without programming unit
24 V DC, integrated (max. 0.4 A)
inputs isolated via optocouplers
Input delay typically 4 ms
Input current typically 10 mA
Relay outputs 230 V AC, \( \cos \phi = 1 \): \( I_{\text{max}} = 2 \) A
230 V AC, \( \cos \phi = 0.4 \): \( I_{\text{max}} = 1 \) A
230 V DC/24 V DC: \( I_{\text{max}} = 1 \) A
230 V AC/24 V AC,
230 V DC/24 V DC: \( I_{\text{min}} \geq 25 \) mA
Contacts protected by varistor when switching inductive loads
Output delay typically 10 ms
unloaded: > 20 x 10⁶ switching cycles
loaded 230 V AC/2A: > 2 x 10⁵ switching cycles
Screw terminals
40
0.01 – 999 s
16, 3 decades each – 8, 4 decades each
8, 4 decades each
1, with 4 decades – 10 kHz
for inputs/outputs and operating modes
376 (including 248 buffered flags)
Cycle monitoring, programming error and checksum by means of programming unit
with miniature programming unit, with IBM PC or compatible PC via 07 PG 201
0 ºC ... 55 ºC in operation
-10 ºC ... 65 ºC storage
90 % without condensation
230 L x 140 H x 102 W

2.5.2 Connection examples

![Diagram](image1)

Figure 2.11: Alternating current loads

![Diagram](image2)

Figure 2.12: Direct current loads
Demagnetization with Zener diode and diode a or diode b directly at the load

2-10
2.5.3 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the basic configuration 07 KR 240 R1.

![Diagram of 07 KR 240 R1]

**Figure 2.13: Basic configuration 07 KR 240 R1**

1. Input terminals
2. Connection socket for programming unit
   - 07 PG 200 or 07 PG 201
3. High-speed counter
4. Interface for expansion modules (07 EB 200, 07 AB 200, ...)
5. Connection socket for memory modules
   - (07 PR 201/07 PR 210)
6. Output terminals
7. Interface for programming unit 07 PG 200 or 07 PG 201

<table>
<thead>
<tr>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00–27</td>
<td>inputs</td>
</tr>
<tr>
<td>50–67</td>
<td>outputs</td>
</tr>
<tr>
<td>Mains</td>
<td>mains voltage present</td>
</tr>
<tr>
<td>STA</td>
<td>start signal</td>
</tr>
<tr>
<td>RUN</td>
<td>system running</td>
</tr>
<tr>
<td>HZ</td>
<td>high-speed counter counting</td>
</tr>
<tr>
<td>HR</td>
<td>high-speed counter reset</td>
</tr>
</tbody>
</table>

2.5.4 High-speed counter, 4 Decades BCD, 10 kHz

A high-speed counter (10 kHz) is integrated in the hardware of the basic configuration 07 KR 240 R1. This BCD counter is limited to 4 decades (max. counting value 9999).

Both the counting input HZ and the resetting input HR are brought out to screw terminals.

The current value of the counter can be interrogated exclusively with FUN 36 (see section 12.4 of the ABB Procentic K200 software description).
2.6 Basic configuration 07 KR 240 R2

2.6.1 Technical data

Number of inputs
Number of outputs
can be expanded with
integrated user program memory
externally plugged for program storage
Cycle time (bit)
Supply voltage
Max. residual ripple of the supply voltage
Current consumption
Additional current consumption when using the
07 PG 200
07 PG 201
Supply voltage of inputs
Input data

Output data

Contact service life

Connections
Timers
Time range
Down counters (24)
Up/down counters
High-speed upward counter
LED display
Flags
Diagnosis

Programming

Permissible temperature range

Humidity class
Dimensions

24
16
max. 64 I/O points
1 K EEPROM (950 words)
2 K EEPROM or 2 K EPROM (1970 words)
typically 5 ms/K instructions
24 V DC (+ 25 %, – 20 %)
1 Vpp at 50 Hz
< 1 A

about 100 mA
about 150 mA
24 V DC, integrated (max. 0.4 A)
inputs isolated via optocouplers
Input delay typically 4 ms
Input current typically 10 mA
Relay outputs 230 V AC, cos ϕ = 1: I_{max} = 2 A
230 V AC, cos ϕ = 0.4: I_{max} = 1 A
230 V DC/24 V DC:
I_{max} = 1 A
230 V AC/24 V AC,
230 V DC/24 V DC: I_{min} ≥ 25 mA
Contacts protected by varistor when switching
inductive loads
Output delay typically 10 ms
unloaded: > 20 x 10^6 switching cycles
loaded 230 V AC/2 A: > 2 x 10^5 switching cycles
Screw terminals
40
0.01 – 999 s
16, 3 decades each – 8, 4 decades each
8, 4 decades each
1, with 4 decades – 10 kHz
for inputs/outputs and operating modes
376 (including 248 buffered flags)
Cycle monitoring, programming error and checksum
by means of programming unit
with miniature programming unit, with IBM PC or
compatible PC via 07 PG 201
0 °C ... 55 °C in operation
– 10 °C ... 65 °C storage
90 % without condensation
230 L x 140 H x 102 W

2.6.2 Connection examples

![](image1)

Figure 2.14: Alternating current loads

![image2](image2)

Figure 2.15: Direct current loads

Demagnetization with Zener diode and
diode a or diode b directly at the load
2.6.3 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the basic configuration 07 KR 240 R2.

![Diagram of 07 KR 240 R2 configuration](image)

Figure 2.16: Basic configuration 07 KR 240 R2

1. Input terminals
2. Connection socket for programming unit
   07 PG 200 or 07 PG 201
3. High-speed counter
4. Interface for expansion modules (07 EB 200, 07 AB 200, ...)
5. Connection socket for memory modules
   (07 PR 201/07 PR 210)
6. Output terminals
7. Interface for programming unit 07 PG 200
   or 07 PG 201
8. Note: Pay attention to polarity 24 V DC

Mains mains voltage present
STA start signal
RUN system running
HZ high-speed counter counting
HR high-speed counter reset

2.6.4 High-speed counter, 4 Decades BCD, 10 kHz

A high-speed counter (10 kHz) is integrated in the hardware of the basic configuration 07 KR 240 R2. This BCD counter is limited to 4 decades (max. counting value 9999).

Both the counting input HZ and the resetting input HR are brought out to screw terminals.

The current value of the counter can be interrogated exclusively with FUN 36 (see section 12.4 of the ABB Proconic K200 software description).

2.6.5 Version of the unit with improved vibration resistance

The basic configuration 07 KR 240 R2 can be delivered also in the version 07 KR 240 R21 with improved vibration resistance. Especially it fits for using in moving machines, e.g. building machines. Please contact your distributor before using the the 07 KR 240 R21, because the requirements for the unit vary depending on the kind of use.
2.7    Basic configuration 07 KT 240 R1

2.7.1    Technical data

Number of inputs
Number of outputs
Type of outputs
can be expanded with
integrated user program memory
externally plugged for program storage
Cycle time (bit)
Supply voltage
Power consumption
Supply voltage of inputs
- Rated value
- "0" signal range
- "1" signal range
Input current at "1" signal
  typ.
  max.
Input data

Output data
- rated value
- allowable range
- lamps wattage
- total current max.
- output delay
Insulation (VDE 160)
- against frame
- against internals
Connections
Timers
Time range
Down counters (24)
Up/down counters
High-speed upward counter
LED display
Flags
Diagnosis
Programming
Permissible temperature range
Humidity class
Dimensions

24
16
Transistor outputs
max. 64 I/O points
1 K EEPROM (950 words)
2 K EEPROM or 2 K EPROM (1970 words)
typically 5 ms/K instructions
230 V AC (+ 15 %, - 25 %) 50/60 Hz
31 VA without programming unit

24 V DC, (integrated max. 0.4 A)
0–7 V DC
19–26.4 V DC use only stabilized mains units
with a max. tolerance of ± 10 %
for external 24 V DC supply

10 mA
13 mA
inputs isolated via optocouplers
Input delay typically 4 ms
Input current typically 10 mA

0.5 mA
10 mA – 0.5 A
max. 5 W
6 A
typically 1 ms

1500 V AC
1500 V AC
Screw terminals
40
0.01 – 999 s
16, 3 decades each – 8, 4 decades each
8, 4 decades each
1, with 4 decades – 10 kHz
for inputs/outputs and operating modes
376 (including 248 buffered flags)
Cycle monitoring, programming error and checksum
by means of programming unit
with miniature programming unit, with IBM PC or
compatible PC via 07 PG 201
0 °C ... 55 °C in operation
- 10 °C ... 65 °C storage
90 % without condensation
230 L x 140 H x 102 W
2.7.2 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the basic configuration 07 KT 240 R1.

![Diagram of Basic configuration 07 KT 240 R1]

Figure 2.17: Basic configuration 07 KT 240 R1

- Input terminals
- Connection socket for programming unit 07 PG 200 or 07 PG 201
- High-speed counter
- Interface for expansion modules (07 EB 200, 07 AB 200, ...)
- Connection socket for memory modules (07 PR 201/07 PR 210)
- Output terminals

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-27</td>
<td>Inputs</td>
</tr>
<tr>
<td>50-67</td>
<td>Outputs</td>
</tr>
<tr>
<td>Mains</td>
<td>Mains voltage present</td>
</tr>
<tr>
<td>STA</td>
<td>Start signal</td>
</tr>
<tr>
<td>RUN</td>
<td>System running</td>
</tr>
<tr>
<td>HZ</td>
<td>High-speed counter counting</td>
</tr>
<tr>
<td>HR</td>
<td>High-speed counter reset</td>
</tr>
</tbody>
</table>

2.7.3 High-speed counter, 4 Decades BCD, 10 kHz

A high-speed counter (10 kHz) is integrated in the hardware of the basic configuration 07 KT 240 R1. This BCD counter is limited to 4 decades (max. counting value 9999).

Both the counting input HZ and the resetting input HR are brought out to screw terminals.

The current value of the counter can be interrogated exclusively with RUN 36 (see section 12.4 of the ABB Proconic K200 software description).
### 2.8 Basic configuration 07 KR 264 R1

#### 2.8.1 Technical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inputs</td>
<td>40</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>24</td>
</tr>
<tr>
<td>can be expanded with</td>
<td></td>
</tr>
<tr>
<td>integrated user program memory</td>
<td></td>
</tr>
<tr>
<td>externally plugged for program</td>
<td></td>
</tr>
<tr>
<td>storage</td>
<td></td>
</tr>
<tr>
<td>Cycle time (bit)</td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td></td>
</tr>
<tr>
<td>Supply voltage of inputs</td>
<td></td>
</tr>
<tr>
<td>Input data</td>
<td></td>
</tr>
<tr>
<td>Output data</td>
<td></td>
</tr>
<tr>
<td>Contact service life</td>
<td></td>
</tr>
</tbody>
</table>

#### Connections

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timers</td>
<td>40</td>
</tr>
<tr>
<td>Time range</td>
<td>0.01 - 999 s</td>
</tr>
<tr>
<td>Down counters (24)</td>
<td>16, 3 decades each - 8, 4 decades each</td>
</tr>
<tr>
<td>Up/down counters</td>
<td>8, 4 decades each</td>
</tr>
<tr>
<td>High-speed upward counter</td>
<td>1, with 4 decades - 10 kHz</td>
</tr>
<tr>
<td>LED display</td>
<td>376 (including 248 buffered flags)</td>
</tr>
</tbody>
</table>

### 2.8.2 Connection examples

- **Figure 2.18:** Alternating current loads
- **Figure 2.19:** Direct current loads

Demagnetization with Zener diode and diode a or diode b directly at the load
2.8.3 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the basic configuration 07 KR 264 R1.

Figure 2.20: Basic configuration 07 KR 264 R1

- Input terminals
- Connection socket for programming unit
  07 PG 200 or 07 PG 201
- High-speed counter
- Interface for expansion modules (07 EB 200, 07 AB 200, ...)
- Connection socket for memory modules
  (07 PR 201/07 PR 210)
- Output terminals
- Interface for programming unit 07 PG 200 or 07 PG 201
- Ground terminal
- 230 V AC = mains (phase, neutral)
- STA = start input
- STO = stop input
- = RUN contact
- 24 V DC, 0 V = Supply voltage for inputs
- HZ = counting input for high-speed counter
- HR = reset input for high-speed counter
- 00-47 = Input terminals
- = unused terminal
- W0-W6 = center contents of relay
- 50-77 = Output terminals (normally open)

LEDs
- 00-47 = inputs
- 50-77 = outputs
- Mains = mains voltage present
- STA = start signal
- RUN = system running
- HZ = high-speed counter counting
- HR = high-speed counter reset

2.8.4 High-speed counter, 4 decades BCD, 10 kHz

A high-speed counter (10 kHz) is integrated in the hardware of the basic configuration 07 KR 264 R1. This BCD counter is limited to 4 decades (max. counting value 9999).

Both the counting input HZ and the resetting input HR are brought out to screw terminals.

The current value of the counter can be interrogated exclusively with FUN 36 (see section 12.4 of the ABB Procontic K200 software description).
2.9 Basic configuration 07 KR 264 R2

2.9.1 Technical data

Number of inputs
Number of outputs
can be expanded with
Integrated user program memory
externally plugged for program storage
Cycle time (bit)
Supply voltage
Max. residual ripple of the supply voltage
Current consumption
Additional current consumption when using the
  07 PG 200
  07 PG 201
Supply voltage of inputs
Input data

Output data

40
24
max. 64 I/O points
1 K EEPROM (950 words)
2 K EEPROM or 2 K EPROM (1970 words)
typically 5 ms/K instructions
24 V- (+ 25 %, - 20 %)
1 V_{PP} at 50 Hz
< 1 A

about 100 mA
about 150 mA
24 V DC, integrated (max. 0.4 A)
inputs isolated via optocouplers
Input delay typically 4 ms
Input current typically 10 mA
Relay outputs 230 V AC, \cos \varphi = 1:  \text{l}_{X_{	ext{max}}} = 2 \text{ A}
                   230 V AC, \cos \varphi = 0.4:  \text{l}_{X_{	ext{max}}} = 1 \text{ A}
                   230 V DC/24 V DC: \text{l}_{X_{	ext{max}}} = 1 \text{ A}
                   230 V AC/24 V AC,
                   230 V DC/24 V DC: \text{l}_{X_{	ext{min}} \geq 25 \text{ mA}}
Contacts protected by varistor when switching
inductive loads
Output delay typically 10 ms
unloaded: > 20 \times 10^{6} switching cycles
loaded 230 V AC/2A: > 2 \times 10^{6} switching cycles
Screw terminals
40
0.01 - 999 s
16, 3 decades each - 8, 4 decades each
8, 4 decades each
1, with 4 decades - 10 kHz
for inputs/outputs and operating modes
376 (including 248 buffered flags)
Cycle monitoring, programming error and checksum
by means of programming unit
with miniature programming unit, with IBM PC or
compatible PC via 07 PG 201
0 °C ... 55 °C in operation
-10 °C ... 65 °C storage
90 % without condensation
330 L x 140 H x 102 W

2.9.2 Connection examples

Figure 2.21: Alternating current loads

Figure 2.22: Direct current loads
Demagnetization with Zener diode and
diode a or diode b directly at the load

2-18
ABB Procentic K200/Issued 02.92
2.9.3 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the basic configuration 07 KR 264 R2.

![Diagram showing pin assignments]

**Figure 2.23: Basic configuration 07 KR 264 R2**

1. Input terminals
2. Connection socket for programming unit 07 PG 200 or 07 PG 201
3. High-speed counter
4. Interface for expansion modules (07 EB 200, 07 AB 200, ...)
5. Connection socket for memory modules (07 PR 201/07 PR 210)
6. Output terminals
7. Interface for programming unit 07 PG 200 or 07 PG 201

**Note:** Pay attention to polarity 24 V DC

24 V - 0 = Ground terminal
STA = start input
STO = stop input
RUN contact
24 V DC, 0 V = Supply voltage for inputs
HZ = counting input for high-speed counter
HR = reset input for high-speed counter
00-47 = Input terminals
* = unused terminal
Ww-Ww = Center contents of relay
50-77 = Output terminals (normally open)

**LEDs**
- 00-47 inputs
- 50-77 outputs
- Mains mains voltage present
- STA start signal
- RUN system running
- HZ high-speed counter counting
- HR high-speed counter reset

**2.8.4 High-speed counter, 4 decades BCD, 10 kHz**

A high-speed counter (10 kHz) is integrated in the hardware of the basic configuration 07 KR 264 R2. This BCD counter is limited to 4 decades (max. counting value 9999).

Both the counting input HZ and the resetting input HR are brought out to screw terminals.

The current value of the counter can be interrogated exclusively with FUN 36 (see section 12.4 of the ABB Proconic K200 software description).
2.10 Basic configurations of category R3

The following mentioned basic configurations allow to change the line voltage between 115 V AC and 230 V AC:

07 KR 220 R3
07 KR 228 R3
07 KR 240 R3
07 KR 264 R3

The line voltage is factory preset to 230 V AC. The line voltage is only to be changed, if the modules are not connected to power line.

Note: The basic configurations of category R3 are only intended for connection to a line voltage of 115 V AC.

If they are connected to a line voltage of 230 V AC the safety standards in accordance with VDE 0160 are not fulfilled.

Technical data

Supply voltage 115 V AC (can be changed to 230 V AC)

Pin assignments

115/230 V AC (AC) = mains (phase, neutral); can be changed

For all other data of the basic configurations of category R3 please refer to the description of the according basic configurations of category R1.

The arrow in figure 2.23 exemplary shows in the case of the basic configuration 07 KR 228 R3 the position of the switch for changing the line voltage. At this position the switch is available at the right top side of the module through the ventilation slits (s. figure 2.24).

![Diagram showing switch position](image)

Figure 2.23: Position of the switch exemplary shown at the basic configuration 07 KR 228 R3

Position of the switch in case of the other basic configurations:

07 KR 220 R3: between terminal 13 and unused terminal •
07 KR 240 R3: at terminal 24
07 KR 264 R3: at terminal 44

![Diagram showing switch positions](image)

Figure 2.24: Switch available through the ventilation slits at the right top side of the module
In Section 3 the technical data of the ABB Procon- 
tic K200 expansion modules listed below are stated. A 
schematic diagram explains the pin configuration.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binary input module</td>
<td>24 V input, 8 point module</td>
<td>8 I/O points are used</td>
</tr>
<tr>
<td>Binary input module</td>
<td>110 V/220 V, input, 8 point module</td>
<td>8 I/O points are used</td>
</tr>
<tr>
<td>Binary output module</td>
<td>Relais output, 8 point module</td>
<td>8 I/O points are used</td>
</tr>
<tr>
<td>Binary output module</td>
<td>Transistor output, 8 point module</td>
<td>8 I/O points are used</td>
</tr>
<tr>
<td>Expansion module</td>
<td>24 inputs, 16 transistor outputs</td>
<td>64 I/O points are used</td>
</tr>
<tr>
<td>Expansion module</td>
<td>24 inputs, 16 outputs</td>
<td>64 I/O points are used</td>
</tr>
<tr>
<td>Input/output module</td>
<td>40 inputs, 24 relay outputs</td>
<td>64 I/O points are used</td>
</tr>
<tr>
<td>Input/output module</td>
<td>40 inputs, 24 relay outputs</td>
<td>64 I/O points are used</td>
</tr>
<tr>
<td>Analog input module</td>
<td>Analog inputs, 2 channels</td>
<td>32 I/O points are used</td>
</tr>
<tr>
<td>Analog output module</td>
<td>Analog outputs, 2 channels</td>
<td>32 I/O points are used</td>
</tr>
</tbody>
</table>

Remarks:

- All ABB Proconic K200 basic configurations can be extended to 64 I/O points.
- DIN VDE 0160 §7.2.2 (mechanical resistance) applies to all ABB Proconic K200 expansion modules.
3.1 Binary Input Module 07 EB 200

3.1.1 Technical Data

- Input voltage: 24 V DC
- Tolerance: 21.5 - 25.4 V DC
- Input Current: typically 10 mA (24 V DC)
- Signal ON: external contact closed, LED on
- Signal OFF: external contact open, LED off
- Voltage min. OFF voltage: 19 V
- Voltage max. ON voltage: 7 V
- Delay element ON -> OFF: typ. 4 ms
- Delay element OFF -> ON: typ. 4 ms
- Functions: optocoupler
- Potential isolation by: 8 per module
- Indication: LED 0 - 7
- Insulation resistance: 20 megaohm min. between terminals and frame at 500 V DC

Fig. 3.1: Input module 07 EB 200

1 = Inputs 0-3, 4-7
2 = Ground terminal (protective ground)
3 = Reference potential (+) of the 24 V DC supply voltage. The two @ are in each case internally connected (see Fig. 3.2).
4 = Interface cable for connection to the basic configuration
3.1.2 Pin assignments

Figure 3.2: Internal circuit of the input module 07 EB 200

Note: In figures 3.2 and 3.3 IO...17 stands for input terminal 0 to input terminal 7.

Figure 3.3: Pin assignment of the input module 07 EB 200
3.2 Binary Input Module 07 EB 205

3.2.1 Technical Data

- Input voltage: 115/230 V AC
- Input Current: 85-250 V AC
- Signal ON: typically 10 mA (220 V AC, 50 Hz)
- Signal OFF: external contact closed, LED on
- Voltage min. ON voltage: 85 V
- Voltage max. OFF voltage: 30 V
- Delay element ON → OFF: typ. 14 ms
- Delay element OFF → ON: typ. 16 ms
- Functions: 8 per module
- Potential isolation by optocoupler
- Indication: LED 0 - 7
- Insulation resistance: 20 megohm min. between terminals and frame at 500 V DC

Note: The creepage distances and the clearances in air meet the VDE standards 0160 and 0110 only for 24 V DC and 115 V AC.

---

**Figure 3.4: Input module 07 EB 205**

1. Inputs 0-3, 4-7
2. = Ground terminal (protective ground)
3. @ = Neutral conductors
   - The two @ are in each case internally connected (see Figure 3.5)
4. = Interface cable for connection to the basic configuration
Figure 3.5: Internal circuit of the input module
07 EB 205

Note: In figures 3.5 and 3.6 10...17 stands for input terminal 0 to input terminal 7.
3.3 Binary output module 07 AB 200

3.3.1 Technical Data

Output
Number of outputs
Switching voltage
Tolerance
Output data

Relay (normally open)
8
115/230 V AC, 24 V DC
85–250 V AC, 21–27 V DC
Relay outputs 230 V AC, cosφ = 1: I_{max} = 2 A
230 V AC, cosφ = 0,4: I_{max} = 1 A
230 V DC/24 V DC: I_{max} = 1 A
230 V AC/24 V AC.
230 V DC/24 V DC: I_{min} ≥ 25 mA

Simultaneous factor
Indication
Leakage current
Output delay
Switching inductive loads
Potential isolation
Short-time peak current
Insulation resistance
Contact service life

0.5 for 4 functions
LED (0 – 7)
–
typically 10 ms
RC element via contact (33 nF, 120 ohm)
yes, please refer to note
6 A ≤ 100 ms
unloaded: > 20 x 10^6 switching cycles
loaded 220 V AC/2 A: > 2 x 10^5 cycles

Note: The creepage distances and the clearances in air met the VDE standards 0160 and 0110 only for 24 V DC and 115 V AC.

---

Figure 3.7: Output module 07 AB 200

1. Outputs 0–3, 4–7
2. Ground terminal (protective ground)
3. L1+/ = Phase (230 V AC) or + supply voltage 24 V DC
4. N/− = Neutral conductor (230 V AC)
   - reference potential of the 24 V DC supply voltage
5. = Interface cable for connection to the basic configuration.
3.3.2 Pin assignments

Figure 3.8: Internal circuit of the output module 07 AB 200

Note: In figures 3.8 and 3.9 00 ... 07 stands for output terminal 0 to output terminal 7.

Figure 3.9: Pin assignment of the output module 07 AB 200

Note: L1/+ of the upper terminal board is electrically insulated against L1/+ of the lower terminal board.
### 3.4 Binary Output Module 07 AB 205

#### 3.4.1 Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of output</td>
<td>transistor output</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>8</td>
</tr>
<tr>
<td>Switching voltage</td>
<td>24 V DC</td>
</tr>
<tr>
<td>Tolerance</td>
<td>5 – 27 V DC</td>
</tr>
<tr>
<td>Maximum switched current</td>
<td>1 A for 40 °C</td>
</tr>
<tr>
<td>Simultaneous factor</td>
<td>0.5</td>
</tr>
<tr>
<td>Indication</td>
<td>LED (0 – 7)</td>
</tr>
<tr>
<td>Leakage current</td>
<td>1 mA</td>
</tr>
<tr>
<td>Output delay</td>
<td>typically 1 ms</td>
</tr>
<tr>
<td>Switching inductive loads</td>
<td>-</td>
</tr>
<tr>
<td>Potential isolation</td>
<td>optocoupler</td>
</tr>
<tr>
<td>Short-time peak current</td>
<td>6 A ≤ 20 ms</td>
</tr>
</tbody>
</table>

---

**Figure 3.10: Output module 07 AB 205**

- ① = Outputs 0-3, 4-7
- ② = Ground terminal (protective ground)
- ③ = Supply voltage 24 V DC
- ④ = Reference potential (-) of the 24 V DC supply voltage
- ⑤ = Interface cable for connection to the basic configuration
3.4.2 Pin assignments

Figure 3.11: Internal circuit of the output module 07 AB 205

Figure 3.12: Pin assignment of the output module 07 AB 205

Note: In figures 3.11 and 3.12 00...07 stands for output terminal 0 to output terminal 7.
### Technical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Values</th>
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<tbody>
<tr>
<td>Number of inputs</td>
<td>24</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>16</td>
</tr>
<tr>
<td>Type of outputs</td>
<td>Transistor outputs</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>230 V~ (+ 15 %, - 25 %) 50/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>29 VA</td>
</tr>
<tr>
<td>Supply voltage of inputs</td>
<td>- Rated value</td>
</tr>
<tr>
<td></td>
<td>- &quot;0&quot; signal range</td>
</tr>
<tr>
<td></td>
<td>- &quot;1&quot; signal range</td>
</tr>
<tr>
<td>Input current at &quot;1&quot; signal</td>
<td>24 V DC, (integrated max. 0.4 A)</td>
</tr>
<tr>
<td></td>
<td>- use only stabilized mains units</td>
</tr>
<tr>
<td></td>
<td>- with a max. tolerance of ± 10 %</td>
</tr>
<tr>
<td></td>
<td>- for external 24 V DC supply</td>
</tr>
<tr>
<td></td>
<td>0–7 V DC</td>
</tr>
<tr>
<td></td>
<td>19–26.4 V DC</td>
</tr>
<tr>
<td>Input data</td>
<td>10 mA</td>
</tr>
<tr>
<td></td>
<td>13 mA</td>
</tr>
<tr>
<td></td>
<td>inputs isolated via optocouplers</td>
</tr>
<tr>
<td></td>
<td>Input delay typically 4 ms</td>
</tr>
<tr>
<td></td>
<td>Input current typically 10 mA</td>
</tr>
<tr>
<td>Output data</td>
<td>0.5 mA</td>
</tr>
<tr>
<td></td>
<td>10 mA - 0.5 A</td>
</tr>
<tr>
<td></td>
<td>max. 5 W</td>
</tr>
<tr>
<td></td>
<td>6 A</td>
</tr>
<tr>
<td></td>
<td>typically 1 ms</td>
</tr>
<tr>
<td>Insulation (VDE 160)</td>
<td>1500 V AC</td>
</tr>
<tr>
<td></td>
<td>1500 V AC</td>
</tr>
<tr>
<td></td>
<td>Screw terminals</td>
</tr>
<tr>
<td>Connections</td>
<td>for inputs/outputs and mains</td>
</tr>
<tr>
<td>LED display</td>
<td>0 °C ... 55 °C in operation</td>
</tr>
<tr>
<td>Permissible temperature range</td>
<td>- 10 °C ... 65 °C storage</td>
</tr>
<tr>
<td></td>
<td>90 % without condensation</td>
</tr>
<tr>
<td>Humidity class</td>
<td>230 L x 140 H x 102 W</td>
</tr>
</tbody>
</table>
3.5.2 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the expansion module 07 EA 240 R2.

![Diagram of 07 EA 240 expansion module]

Figure 3.13: Expansion module 07 EA 240 R2

1. Input terminals
2. Output terminals
3. Interface for connection to the basic configuration
4. Ground terminal
5. 230 V AC = mains (phase, neutral)
6. 24 V DC, 0 V = supply voltage for inputs
7. 100–127 = Input terminals
8. • = unused terminal
9. Wo–Wo = potential reference of outputs
10. 150–167 = Output terminals

LEDs
- 100–127 inputs
- 150–167 outputs

Mains mains voltage present
3.6 Expansion module 07 EA 240 R4

3.6.1 Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inputs</td>
<td>24</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>16</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 V DC (+ 25 %, - 20 %)</td>
</tr>
<tr>
<td>Max. residual ripple of the supply voltage</td>
<td>1 Vpp at 50 Hz</td>
</tr>
<tr>
<td>Current consumption</td>
<td>&lt; 0.5 A</td>
</tr>
<tr>
<td>Supply voltage of inputs</td>
<td>24 V DC, integrated (max. 0.4 A)</td>
</tr>
<tr>
<td>Input data</td>
<td>inputs isolated via optocouplers</td>
</tr>
<tr>
<td>Input delay typically</td>
<td>4 ms</td>
</tr>
<tr>
<td>Input current typically</td>
<td>10 mA</td>
</tr>
</tbody>
</table>

**Output data**

<table>
<thead>
<tr>
<th>Relay outputs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V AC, cos φ = 1:</td>
<td>I_{max.} = 2 A</td>
</tr>
<tr>
<td>230 V AC, cos φ = 0.4:</td>
<td>I_{max.} = 1 A</td>
</tr>
<tr>
<td>230 V DC/24 V DC:</td>
<td>I_{max.} = 1 A</td>
</tr>
<tr>
<td>230 V AC/24 V AC:</td>
<td>I_{min.} ≥ 25 mA</td>
</tr>
</tbody>
</table>

Contacts protected by varistor when switching inductive loads

Output delay typically 10 ms

unloaded: > 20 x 10^6 switching cycles

loaded 230 V AC/2A: > 2 x 10^5 switching cycles

Screw terminals

for inputs/outputs and mains

0 °C ... 55 °C in operation

-10 °C ... 65 °C storage

90 % without condensation

230 L x 140 H x 102 W

3.6.2 Connection examples

![Diagram 3.14: Alternating current loads](image)

![Diagram 3.15: Direct current loads](image)

Figure 3.14: Alternating current loads

Demagnetization with Zener diode and diode a or diode b directly at the load.
3.6.3 Pin assignments

The terminal assignments and the meaning of the individual LEDs are explained with the following drawing of the expansion module 07 EA 240 R4.

![Diagram of expansion module](image)

Figure 3.16: Expansion module 07 EA 240 R4

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢</td>
<td>Input terminals</td>
</tr>
<tr>
<td>🟠</td>
<td>Output terminals</td>
</tr>
<tr>
<td>🟣</td>
<td>Interface for connection to the basic configuration</td>
</tr>
<tr>
<td>🟢</td>
<td>Note: Pay attention to polarity 24 V DC</td>
</tr>
<tr>
<td>🟢</td>
<td>🟠</td>
</tr>
<tr>
<td>🟢</td>
<td>🟠</td>
</tr>
<tr>
<td>🟢</td>
<td>🟠</td>
</tr>
<tr>
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<td>🟠</td>
</tr>
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<td>🟢</td>
<td>🟠</td>
</tr>
<tr>
<td>🟢</td>
<td>🟠</td>
</tr>
<tr>
<td>🟢</td>
<td>🟠</td>
</tr>
</tbody>
</table>

LEDs

- 100-127 inputs
- 150-167 outputs
- Mains mains voltage present

ABB Procontic K200/issued: 02.92
### 3.7 Combined input/output module 07 EA 264 R1

#### 3.7.1 Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inputs</td>
<td>40</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>24</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>230 V AC (+ 15 %, - 25 %) 50/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>37 VA</td>
</tr>
<tr>
<td>Input data</td>
<td>Inputs isolated via optocouplers</td>
</tr>
<tr>
<td>Input delay typically</td>
<td>4 ms</td>
</tr>
<tr>
<td>Input current typically</td>
<td>10 mA</td>
</tr>
<tr>
<td>Relay outputs</td>
<td>230 V AC, $\cos \varphi = 1$: $I_{\text{max}} = 2$ A</td>
</tr>
<tr>
<td></td>
<td>230 V AC, $\cos \varphi = 0.4$: $I_{\text{max}} = 1$ A</td>
</tr>
<tr>
<td></td>
<td>230 V DC/24 V DC: $I_{\text{max}} = 1$ A</td>
</tr>
<tr>
<td></td>
<td>230 V AC/24 V AC, $I_{\text{min}} \geq 25$ mA</td>
</tr>
<tr>
<td></td>
<td>230 V DC/24 V DC: $I_{\text{min}} \geq 25$ mA</td>
</tr>
</tbody>
</table>

**Output data**

**Output delay typically 10 ms**

---

**Figure 3.17:** Input/output expansion module 07 EA 264 R1

- **LEDs**
  - 100–147 inputs
  - 150–177 outputs
  - Mains mains voltage available
  - Input terminals 100–147
  - Output terminals 150–177 (normally open)
  - Interface cable for connection to the basic configuration

- **Symbols**
  - Ground terminal
  - Mains (phase, neutral)
  - Supply voltage for inputs
  - Input terminals
  - Unused terminal
  - Center contacts of relay
  - Output terminals (normally open)
3.7.2 Connection examples

Figure 3.18: Direct current loads
Demagnetization with Zener diode and diode a or diode b directly at the load

Figure 3.19: Alternating current loads
3.8 Combined input/output module 07 EA 264 R5

3.8.1 Technical data

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inputs</td>
<td>40</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>24</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 V DC (+ 25%, - 20%)</td>
</tr>
<tr>
<td>Max. residual ripple of the supply voltage</td>
<td>1 Vpp at 50 Hz</td>
</tr>
<tr>
<td>Current consumption</td>
<td>&lt; 1 A</td>
</tr>
<tr>
<td>Input data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>inputs isolated via optocouplers</td>
</tr>
<tr>
<td></td>
<td>Input delay typically 4 ms</td>
</tr>
<tr>
<td></td>
<td>Input current typically 10 mA</td>
</tr>
<tr>
<td>Output data</td>
<td></td>
</tr>
<tr>
<td>Relay outputs 230 V AC, cos(\phi) = 1:</td>
<td>Imax. = 2 A</td>
</tr>
<tr>
<td></td>
<td>230 V AC, cos(\phi) = 0.4:</td>
</tr>
<tr>
<td></td>
<td>230 V DC/24 V DC:</td>
</tr>
<tr>
<td></td>
<td>230 V AC/24 V AC,</td>
</tr>
<tr>
<td></td>
<td>230 V DC/24 V DC:</td>
</tr>
<tr>
<td>Output delay typically 10 ms</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.20: Input/output expansion module 07 EA 264 R5

- \(\oplus\) 24 V - O = mains
- 24 V DC, 0 V = supply voltage for inputs
- 100-147 = input terminals
- = unused terminal
- \(\odot\) W5 = center contents of relay
- 150-177 = output terminals (normally open)

LEDs
- 100-147 = inputs
- 150-177 = outputs
- Mains = mains voltage available

1. Input terminals 100-147
2. Output terminals 150-177 (normally open)
3. Interface cable for connection to the basic configuration
4. Pay attention to polarity 24 V DC

ASB Proconic K200/issued: 02.92

3-16
3.8.2 Connection examples

Figure 3.21: Direct current loads
Demagnetization with Zener diode and diode a or diode b directly at the load

Figure 3.22: Alternating current loads
3.9 Analog modules

3.9.1 Generality

There is a total of 64 bits reserved for ABB Procon Tic K200 expansion modules. One analog module occupies an address zone of 32 bits. Only a max. of two analog modules can therefore be connected to a basic central unit. It means that it cannot be implemented more binary inputs and outputs than those of the basic central unit.

The analog modules process positive voltages ranging from 0 – 10 V, or respectively currents from 4 – 20 mA. In the 4 – 20 mA operation mode, with the 07 EA 200 analog inputs module, it is not possible to effect broken wire control, which means that not effected terminal connections will be interpreted as 0 signals.

Address assignation:

Analog modules occupy the same address zone (expansion modules 100 – 177) as the binary input/output modules. Every analog channel occupies a 16 bit address zone, it means thus that 2 channels occupy 32 address bits.

<table>
<thead>
<tr>
<th>Channel No.</th>
<th>Address No.</th>
<th>Terminal</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100-117</td>
<td>V0, 10</td>
<td>1st analog expansion module (32 bits)</td>
</tr>
<tr>
<td>2</td>
<td>120-137</td>
<td>V1, 11</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>140-157</td>
<td>V0, 10</td>
<td>2nd analog expansion module (32 bits)</td>
</tr>
<tr>
<td>4</td>
<td>160-177</td>
<td>V1, 11</td>
<td></td>
</tr>
</tbody>
</table>

3.9.2 Analog input module 07 EA 200

3.9.2.1 Technical data

Number of channels
Current consumption
Input working range (rated value)
Digital resolution
Potential isolation via
Input resistance
Max. analog error related to output value
Temperature coefficient
Data format
Conversion time of whole input circuit
Interaction between channels
Linearity errors
Destruction limit
Ambient temperature
Humidity class
Weight

2
130 mA
Current input: 4–20 mA, Voltage input: 0–10 V
8 bits
Optocouplers, nevertheless not between channels
Current input: 220 Ω, voltage input: 10 MΩ
± (1 % + 1 bit)
± 50 ppm/K
BIN (8 bits)
1 ms
No mutual interaction. Channels are related to same potential.
1 % + 1 bit
Max. input current: 30 mA
0 – 55 °C
≤ 90 % without condensation
0.5 kg

Word processing:

Data format of CPU (basic unit):
16 bits, BCD coded, without sign

Value range:
0-9999
It is not possible to show negative numbers.

Data format of analog input and analog output:
Bits15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
not used 0 – 255

The analog modules 07 EA 200 and 07 AA 200 work on a confidence level of 8 bits.

Resolution: ± 19.5 mV or ± 31 μA resp.

For further processing (e. g. addition) the analog value is to be converted in BCD format. In case of the output of analog values a BCD/Binary conversion is necessary accordingly.
3.9.2.2 External wiring

Figure 3.24: External wiring (voltage input)

Figure 3.25: External wiring (current input)

3.9.2.3 Block connection diagram

Figure 3.26: 07 EA 200 block connection diagram

1. 0V, 0V, 0V, 0V: Here connect 0 V with at least 2.5 mm² wire.

2. Shield terminal: The metal shield protection plates, provided side wards inside the unit, for screening radiation, are connected to a terminal.

3. V0: Voltage input operation mode, channel 1, address 100-117, when it is used as 1st analog module, or respectively, channel 3, address 140-157, when used as 2nd analog module.

4. I0: Current input operation mode: see 3 for channel and address.

5. V1: Voltage input operation mode, channel 2, address 120-137, when it is used as 1st analog module, or respectively, channel 4, address 160-177, when used as 2nd analog module.

6. I1: Current input operation mode: see 5 for channel and address.

7. 24V, 24V: Connect here +24 V DC with at least 2.5 mm² wire.

8. LED: It indicates that it is available the +15 V from the DC/DC converter.

9. Interface connection cable for connection to the basic expandable unit.
3.9.3 Analog output module 07 AA 200

3.9.3.1 Technical data

Number of channels
Current consumption
Output working range (rated value)
Digital resolution
Potential isolation via
Output resistance
Max. analog error related to the end value
Temperature coefficient
Data format
Conversion time of the whole output circuit
Interaction between channels
Linearity error
Destruction error
Ambient temperature
Humidity class
Weight

2
180 mA
Current output: 4–20 mA, voltage output: 0–10 V
8 bits
Optocouplers, nevertheless not between channels
Current output: 0–500 Ω, voltage output: > 10 kΩ
± 1 %
± 50 ppm/K
BIN (8 bits)
1 ms
No mutual interaction. Channels are related to
same potential.
1 % + 1 bit
Max. input voltage: 15 V
0 – 55 °C
≤ 90 % without condensation
0.5 kg

1. **0V–0V**–**0V–0V**: Here connect 0 V with at least
2.5 mm² wire.

2. Shield terminal: The metal shield protection
plates, provided side wards inside the unit, for
screening radiation, are connected to a terminal.

3. **V0**: Voltage input operation mode, channel 1, ad-
dress 100–117, when it is used as 1st analog
module, or respectively, channel 3, address
140–157, when used as 2nd analog module.

4. **I0**: Current input operation mode; see 3 for
channel and address.

5. **V1**: Voltage input operation mode, channel 2, ad-
dress 120–137, when it is used as 1st analog
module, or respectively, channel 4, address
160–177, when used as 2nd analog module.

6. **I1**: Current input operation mode; see 5 for
channel and address.

7. **24 V–24 V**: Connect here + 24 V DC with at
least 2.5 mm² wire.

8. LED: It indicates that it is available the +15 V
from the DC/DC converter.

9. Interface connection cable for connection to the
basic expandable unit.
3.9.3.2 External wiring

Figure 3.28: External wiring (voltage output)

Figure 3.29: External wiring (current output)

3.9.3.3 Block connection diagram

Figure 3.30: 07 AA 200 block connection diagram

3.9.3.4 Avoiding undefined states of output channels

The analog channels adopt an undefined state, from the power turn on instant until run operation mode (approx. 300 ms). It means that the output level will be between 0 and + 10 V, or respectively, 4 and 20 mA, for approx. 300 ms.

Possibilities for avoiding undefined states:

a. The supply voltage for the analog output units will be connected after system initialization, over the RUN contacts of the basic expandable unit, to the 07 AA 200 analog output unit (see Figures 3.31 - 3.33).

Figure 3.31

b. 

Figure 3.32

c. 

Figure 3.33
3.9.4 Configuration possibilities

Every ABB Proconic K200 basic configuration can be expanded with analog modules. It will be shown in the next examples how to connect analog modules to the basic configuration.

Example 1:

Figure 3.34 illustrates following possible configuration: A basic configuration unit will be expanded with one analog input and one analog output module.

![Diagram](image1)

Remark: A basic expansion unit can be expanded up to a maximum of two analog modules, which in turn means that it can be reached a maximum of 4 analog channels. An additional binary expansion is not possible.

Example 2:

Figure 3.35 illustrates following configuration possibility: A basic expansion unit will be expanded with two analog modules.

![Diagram](image2)

Figure 3.35

It is also reached the maximum expansion possibility in this configuration (see remark in example 1).

Example 3:

Figure 3.36 illustrates following configuration possibility: A basic expansion module will be expanded with two analog output modules.

![Diagram](image3)

Figure 3.36

It is also reached the maximum expansion possibility in this configuration (see remark in example 1).

Example 4:

Figure 3.37 illustrates following configuration possibility: A basic expansion unit will be expanded with one analog output module (1st expansion module). It will additionally be made an expansion with an analog input module (2nd expansion module).

![Diagram](image4)

Figure 3.37

Compared to the example 1, the first expansion module is interchanged with the second in this configuration, which means that the analog modules can be used at desired addresses. Addressing will be determined by its relative position.

Caution: By modules change (for instance for service purposes) the modules must be fitted again into their original positions.)
Example 5:

Figure 3.38 illustrates following configuration possibility: A basic expansion unit will be expanded with a binary 8 I/O module (for instance 07 EB 200). An analog module will be additionally connected to them and then also a second binary 8 I/O module.

![Diagram of configuration](image)

**Figure 3.38**

This configuration shows that a basic expansion unit may be expanded with one analog module and with binary input/output modules at the same time. A system may be still expanded with a max. of 32 binary inputs/outputs, when a basic expandable unit is expanded with one analog module.

**Analog module:**

The lower 8 bits of channel 0 and of channel 1 will be occupied by the analog data. The upper 8 bits will not be used.

### 3.9.5 Correlation between analog and digital data

#### 3.9.5.1 Current input/output

The analog current signal ranges from 4 – 20 mA and corresponds to the digital data as follows:

<table>
<thead>
<tr>
<th>Analog digital (HEX)</th>
<th>Digital (Dec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 mA</td>
<td>(00)</td>
</tr>
<tr>
<td>4 mA</td>
<td>(00)</td>
</tr>
<tr>
<td>20 mA</td>
<td>(FF)</td>
</tr>
</tbody>
</table>

**电压输入/输出**

The analog voltage signal ranges from 0 – 10 V and corresponds to the digital data as follows:

<table>
<thead>
<tr>
<th>Analog digital (HEX)</th>
<th>Digital (Dec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 mA</td>
<td>(00)</td>
</tr>
<tr>
<td>20 mA</td>
<td>(FF)</td>
</tr>
</tbody>
</table>

An analog signal will be converted in binary (digital) data (BNR) with the analog module. Since the numerical process will be carried out in BCD format at ABB Procontic K200, the binary data must be converted in BCD data by means of FUN 24.

The result will be available after the conversion with FUN 25 in BNR format at the analog inputs.
3.10 Combined input/output module
07 EA 264 R3

The combined input/output module 07 EA 264 R3 allows to change the line voltage between 115 V AC and 230 V AC:

The line voltage is factory preset to 230 V AC. The line voltage is only to be changed, if the module is not connected to power line.

Note: The combined input/output module 07 EA 264 R3 is only intended for connection to a line voltage of 115 V AC.

If it is connected to a line voltage of 230 V AC the safety standards in accordance with VDE 0160 are not fulfilled.

Technical data
Supply voltage 115 V AC (can be changed to 230 V AC)

Pin assignments
115/230 V~ (AC) = mains (phase, neutral); can be changed

For all other data of the combined input/output module 07 EA 264 R3 please refer to the description of the combined input/output module 07 EA 264 R1.

The arrow in figure 3.39 shows the position of the switch for changing the line voltage. At this position the switch is available at the right top side of the module through the ventilation slits (s. figure 3.40).

Figure 3.39: Position of the switch

Figure 3.40: Switch available through the ventilation slits at the right top side of the module
Serviceability test of the ABB Procontic K200 basic configurations with 07 PG 200 by means of an internal test program

4.1 Testing of the basic configuration

The ABB Procontic K200 is equipped with a test program by means of which the system and the programming unit 07 PG 200 can be subjected in situ at the plant or in the workshop to a self-test. The test program is filed in the EEPROM memory.

The operation mode switch is set to position PROG. In the left column of table 1 the necessary input data are listed which will produce the respective displays (on the right-hand side in the display CPU). After approx. 17 s the display changes and 950 or 1970 resp. will appear.

<table>
<thead>
<tr>
<th>Input</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLR</td>
<td>8</td>
</tr>
<tr>
<td>SET</td>
<td>88</td>
</tr>
<tr>
<td>ENT</td>
<td>A--</td>
</tr>
<tr>
<td>FUN</td>
<td>A--E</td>
</tr>
<tr>
<td>RES</td>
<td>SELF0</td>
</tr>
<tr>
<td>7 SET</td>
<td>C--P</td>
</tr>
<tr>
<td>MON</td>
<td>SELF1</td>
</tr>
<tr>
<td>MO2</td>
<td>C--H</td>
</tr>
<tr>
<td>CLR</td>
<td>SELF2</td>
</tr>
<tr>
<td>MON</td>
<td></td>
</tr>
<tr>
<td>7 SET</td>
<td>CPU</td>
</tr>
<tr>
<td>MON</td>
<td></td>
</tr>
</tbody>
</table>

Completed after about 17 s

Table 1

00 01 02 03 04 05 06 07 10 11 12 13 14 15 16 17 20 21 22 23 24 25 26 27 30 31 32 33 34 35 36 37 40 41 42 43 44 45 46 47

Table 2

If the operating mode switch is now set to position RUN and the control system is started up by a "1" signal at input STA the activation of certain input channels with 24 V signals will cause the switching of certain output channels to "1" signal.

Table 2 shows which output will be switched to "1" signal when a "1" signal is present at a specific input.

After completion of the I/O tests the high-speed 10 kHz counter can be tested with "1" signals at the counter inputs HZ (counting) and HR (resetting). The counter reading is projected in the program via FUN 36 to the output channels 50 to 67. For explanations of function FUN 36 see section 12.4 of the ABB Procontic K200 software description.

*) 950 is displayed, if no program memory module is plugged in. 1970 is displayed, if the program memory module 07 PR 201 or 07 PR 210 is plugged in.

○ indicates that the outputs are enabled

Table 2
4.2 Testing of the Basic Configuration and of the Miniature Programming Unit 07 PG 200

The operating mode switch is set to position PROG. If the self-test is performed in the sequence listed in Table 3, a test program for the input/output channels is written into the integrated or plugged-in EEPROM.

Attention: User programs in the EEPROM memory are erased by this procedure.

Table 3 shows the sequence of input data for testing the basic configuration and the programming unit as well as the running times of the test.

<table>
<thead>
<tr>
<th>Function</th>
<th>Mode of operation</th>
<th>System status</th>
</tr>
</thead>
<tbody>
<tr>
<td>System test</td>
<td>PROG</td>
<td>STOP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input via keyboard and display</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Display</td>
<td>Remark</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>11111111</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2222222</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>444444</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>000000</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>000000</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>PPPPPP</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>HHHHHH</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>CCCCCC</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>888888</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>FFFFFF</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>888888</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>000000</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>111111</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>222222</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>333333</td>
</tr>
<tr>
<td>17</td>
<td>17</td>
<td>FFFFFF</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>EEEEEE</td>
</tr>
<tr>
<td>19</td>
<td>19</td>
<td>000000</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>444444</td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>555555</td>
</tr>
<tr>
<td>22</td>
<td>22</td>
<td>666666</td>
</tr>
<tr>
<td>23</td>
<td>23</td>
<td>777777</td>
</tr>
<tr>
<td>24</td>
<td>24</td>
<td>888888</td>
</tr>
<tr>
<td>25</td>
<td>25</td>
<td>999999</td>
</tr>
<tr>
<td>26</td>
<td>26</td>
<td>000000</td>
</tr>
</tbody>
</table>

Table 4 shows the response of the display at the programming unit 07 PG 200 to the keyboard input.

<table>
<thead>
<tr>
<th>No.</th>
<th>Input</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>11111111</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2222222</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>444444</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>000000</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>000000</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>PPPPPP</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>HHHHHH</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>CCCCCC</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>888888</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>FFFFFF</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>888888</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>000000</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>111111</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>222222</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>333333</td>
</tr>
<tr>
<td>17</td>
<td>17</td>
<td>FFFFFF</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>EEEEEE</td>
</tr>
<tr>
<td>19</td>
<td>19</td>
<td>000000</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>444444</td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>555555</td>
</tr>
<tr>
<td>22</td>
<td>22</td>
<td>666666</td>
</tr>
<tr>
<td>23</td>
<td>23</td>
<td>777777</td>
</tr>
<tr>
<td>24</td>
<td>24</td>
<td>888888</td>
</tr>
<tr>
<td>25</td>
<td>25</td>
<td>999999</td>
</tr>
<tr>
<td>26</td>
<td>26</td>
<td>000000</td>
</tr>
</tbody>
</table>

Table 4

For the self-test of the cassette recorder interface a recorder is required. Without it this test cannot be performed.

If this test is to be passed over the procedure shall be as described in Table 1.

After completion of the test referred to in Table 3 the input and output channels during RUN operation (set operating mode switch to position RUN) can be tested.

The high-speed counter can also be tested with the counter input HZ and the resetting input HR. The counter reading shall be taken at the outputs (see Sect. 3.1).
5.1 Interface Connection Cables 07 SK 200 and 07 SK 201

With the interface connection cables 07 SK 200 (length: 0.6 m) and 07 SK 201 (length: 1.5 m) the connection between basic unit and extension modules is established.

Fig. 5.1: Interface connection cable 07 SK 201

5.2 System Cable 07 SK 202 R2

The system cable 07 SK 202 (length: 2 m) is a RS-232-C cable required for connecting the programming unit 07 PG 201 with the PC 07 PC 31/32.

Fig. 5.2: System cable 07 SK 202 R2

<table>
<thead>
<tr>
<th>Signal names</th>
<th>07 PG 201</th>
<th>PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>RxD Receive Data</td>
<td>2</td>
<td>2 TxD</td>
</tr>
<tr>
<td>TxD Transmit Data</td>
<td>3</td>
<td>3 RxD</td>
</tr>
<tr>
<td>RTS Clear to send</td>
<td>6</td>
<td>5 CTS</td>
</tr>
<tr>
<td>CTS Data terminal ready</td>
<td>11</td>
<td>20 DTR</td>
</tr>
<tr>
<td>GND Ground</td>
<td>7</td>
<td>7 GND</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 DSR</td>
</tr>
</tbody>
</table>

Fig. 5.4: Terminal assignment 07 SK 202 R2

<table>
<thead>
<tr>
<th>Signal names</th>
<th>07 SK 202 R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>RxD Receive Data</td>
<td></td>
</tr>
<tr>
<td>TxD Transmit Data</td>
<td></td>
</tr>
<tr>
<td>CTS Clear to send</td>
<td></td>
</tr>
<tr>
<td>DTR Data terminal ready</td>
<td></td>
</tr>
<tr>
<td>GND Ground</td>
<td></td>
</tr>
<tr>
<td>DSR Data set ready</td>
<td></td>
</tr>
<tr>
<td>DCD Data carrier detect</td>
<td></td>
</tr>
<tr>
<td>RTS Request to send</td>
<td></td>
</tr>
</tbody>
</table>

ABB Procentic K200/Issued: 06.90
5.3 System Cable 07 SK 203 R1

The system cable 07 SK 203 R1 (length: 2 m) is a RS-232-C cable required for connecting the programming unit 07 PG 201 with the printer 07 DR 11 (RS-232-C interface).

Fig. 5.5: System cable 07 SK 203 R1

<table>
<thead>
<tr>
<th>O7 PG 201</th>
<th>printer O7 DR 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 pol.-MIN-D-connector male</td>
<td>25 pol.-MIN-D-connector male</td>
</tr>
<tr>
<td>RxD 2</td>
<td>2 TxD</td>
</tr>
<tr>
<td>TxD 3</td>
<td>3 RxD</td>
</tr>
<tr>
<td>RTS 6</td>
<td>5 CTS</td>
</tr>
<tr>
<td>GND 7</td>
<td>7 GND</td>
</tr>
<tr>
<td>CTS 11</td>
<td>4 RTS</td>
</tr>
</tbody>
</table>

Fig. 5.6: System cable 07 SK 203 R2

<table>
<thead>
<tr>
<th>O7 PG 201</th>
<th>printer O7 DR 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 pol.-MIN-D-connector male</td>
<td>25 pol.-MIN-D-connector male</td>
</tr>
<tr>
<td>TxD 3</td>
<td>3 RxD</td>
</tr>
<tr>
<td>RTS 6</td>
<td>6 DSR</td>
</tr>
<tr>
<td>RxD 2</td>
<td>2 TxD</td>
</tr>
<tr>
<td>CTS 11</td>
<td>11 RevCH 2nd=RTS</td>
</tr>
<tr>
<td>GND 7</td>
<td>7 GND</td>
</tr>
<tr>
<td>PGND 1</td>
<td>1 PGND</td>
</tr>
</tbody>
</table>

Bild 5.7: Terminal assignment 07 SK 203 R2

<table>
<thead>
<tr>
<th>Signal names</th>
<th>Signal names</th>
</tr>
</thead>
<tbody>
<tr>
<td>RxD Receive Data</td>
<td>DSR Data set ready</td>
</tr>
<tr>
<td>TxD Transmit Data</td>
<td>GND Ground</td>
</tr>
<tr>
<td>RTS Request to send</td>
<td>PGND Protective Ground</td>
</tr>
<tr>
<td>GND Ground</td>
<td>CTS Clear to send</td>
</tr>
</tbody>
</table>
5.5 Memory modules 07 PR 201 and 07 PR 210

By using the memory module 07 PR 201 (EEPROM) or the memory module 07 PR 210 (EPROM) user programs can be quickly exchanged. Both memory modules are designed for 2 K instructions (1970 words). Buffer batteries are not required when EEPROMs or EPROMs are used.

Notes: Don't plug in or remove when supply voltage is on.

To avoid damages please use a coin to remove the cover from the basic configuration.
By means of the simulation units 07 SG 228 and 07 SG 240 the existing peripherals (position switches, initiators etc.) can be simulated on the input side.

Values for program designators may be assigned and their effect on the program prepared can be tested.

Supply voltage

The simulation units receive their supply voltage (24 V DC) from the basic configuration of the ABB Procontic K200 system.

Momentary-contact pushbuttons

The simulation units are equipped with 4 pushbuttons each.

<table>
<thead>
<tr>
<th>No.</th>
<th>Designation</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HZ</td>
<td>Counter input of the high-speed counter</td>
</tr>
<tr>
<td>2</td>
<td>HR</td>
<td>Reset input of the high-speed counter</td>
</tr>
<tr>
<td>3</td>
<td>STA</td>
<td>Start input (starting of the program)</td>
</tr>
<tr>
<td>4</td>
<td>STO</td>
<td>Stop input (stopping of the program)</td>
</tr>
</tbody>
</table>

Possibility for use

The simulation unit 07 SG 228 can be used together with the following ABB Procontic K200 basic configurations:

- 07 KR 220 R1
- 07 KR 228 R1
- 07 KR 228 R3
- 07 KT 228 R1.

The simulation unit 07 SG 240 can be used together with the following ABB Procontic K200 basic configurations:

- 07 KR 240 R1
- 07 KR 240 R2
- 07 KR 240 R3
- 07 KT 240 R1.
5.8 Power Supply Unit 07 NG 32 R1
primary voltage: 115/230 V AC, secondary voltage: 24 V DC, 2.5 A

The 07 NG 32 power supply unit generates a 24 V DC voltage from a single-phase mains voltage of 115 V AC or 230 V AC. For applications in electronic control systems, the output voltage is smoothed by electrolytic capacitors. The power supply unit has a load capability of 2.5 A. A green LED indicates that the 24 V DC is present.

The primary and the secondary voltage are protected by built-in miniature fuses (5 x 20 mm). The electrical connections are made over screw-type terminals (see Fig. 5.8-1. Top view with circuit diagram imprint and terminal assignment). Cable grips fasten the cables. There is an electrical isolation between the primary and the secondary voltage according to VDE 0551 (safety electrical isolation).

The power supply unit has a mounting base which allows the user to snap the unit onto a DIN rail (EN 50022). If this mounting base is removed, the unit can be fastened by 4 screws M4 (see Fig. 5.8-2, drilling pattern).

The power supply unit must be mounted so that the convection air current is not disturbed.

The power supply unit has a height (depth if mounted on rear panel) of ca. 145 mm.

Fig. 5.8-1: Top view with circuit diagram imprint and terminal assign- ment

Fig. 5.8-2: Drilling pattern and outline dimen-
sions of the power supply unit
## Technical data

### Electrical data, input specifications

**Primary voltage 115 V AC**
- **Rated voltage**: 115 V AC
- **Limiting values**: 103.5...126.5 V AC
- **Mains frequency**: 50 or 60 Hz
- **Current consumption**
  - with no load: ca. 180 mA
  - with rated load: ca. 900 mA
- **Miniature fuse**
  - primary: 2.5 A slow, sand-filled, 5 x 20 mm

**Primary voltage 230 V AC**
- **Rated voltage**: 230 V AC
- **Limiting values**: 207...253 V AC
- **Mains frequency**: 50 or 60 Hz
- **Current consumption**
  - with no load: ca. 90 mA
  - with rated load: ca. 450 mA
- **Miniature fuse**
  - primary: 1.6 A slow, sand-filled, 5 x 20 mm.
  - (this fuse is inserted by the factory)

**Max. conductor cross section of the terminals**: 2.5 mm²

### Electrical data, output specifications

**Secondary voltage (output voltage)**
- **Rated voltage**: 24 V DC
- **Limiting values**: 19.2...30 V DC
- **Max. ripple content**: ≤ 5 %
- **Display of the present voltage**: with green LED

**Output load capability**
- **Rated current (permitted continuous load)**: 2.5 A

**Miniature fuse, secondary**: 4.0 A medium time-lag, sand-filled

**Max. conductor cross section of the terminals**: 2.5 mm², plus and minus poles are assigned to two terminals each

### Mechanical data

**Mounting**
- onto a DIN rail or with 4 screws M4

**Mechanical dimensions**
- **Mounting base**: 85 x 75 mm (120 mm), see Fig. 5.8-2, Drilling pattern
- **Height (depth if mounted on rear panel)**: 145 mm

**Weight**: 2.2 kg

**Cooling**: The power supply unit must be mounted so that the convection air current is not disturbed.

**Ambient temperature**: max. 55 °C (with 100 % load)

**Standards, regulations**: VDE 0160, transformer according to VDE 0551

### Ordering data

**Order number**
- 07 NG 32 R1

**GJV3 0756 01 R1**
5.9 Power Supply Unit 07 NG 34 R1
primary voltage: 115/230 V AC, secondary voltage: 24 V DC, 5 A

The 07 NG 34 power supply unit generates a 24 V DC voltage from a single-phase mains voltage of 115 V AC or 230 V AC. For applications in electronic control systems, the output voltage is smoothed by electrolytic capacitors. The power supply unit has a load capability of 5 A. A green LED indicates that the 24 V DC is present.

The primary and the secondary voltage are protected by built-in miniature fuses (5 x 20 mm). The electrical connections are made over screw-type terminals (see Fig. 5.9-1). Top view with circuit diagram imprint and terminal assignment. Cable grips fasten the cables. There is an electrical isolation between the primary and the secondary voltage according to VDE 0551 (safety electrical isolation).

The power supply is fastened by 4 screws M5 (see Fig. 5.9-2, drilling pattern).

The power supply unit must be mounted so that the convection air current is not disturbed.

The power supply unit has a height (depth if mounted on rear panel) of ca. 145 mm.

Fig. 5.9-1: Top view with circuit diagram imprint and terminal assignment
The power supply unit has a height (depth if mounted on rear panel) of ca. 145 mm.

Fig. 5.9-2: Drilling pattern and outline dimensions of the power supply unit
Technical data

Electrical data, input specifications

Primary voltage 115 V AC
  Rated voltage: 115 V AC
  Limiting values: 103.5...125.5 V AC
  Mains frequency: 50 or 60 Hz
  Current consumption: with no load ca. 0.35 A
  with rated load ca. 1.60 A
  Miniature fuse: primary 4 A slow, sand-filled, 5 x 20 mm

Primary voltage 230 V AC
  Rated voltage: 230 V AC
  Limiting values: 207...253 V AC
  Mains frequency: 50 or 60 Hz
  Current consumption: with no load ca. 0.17 A
  with rated load ca. 0.85 A
  Miniature fuse: primary 2 A slow, sand-filled, 5 x 20 mm,
  (this fuse is inserted by the factory)

Max. conductor cross section of the terminals 2.5 mm²

Electrical data, output specifications

Secondary voltage (output voltage)
  Rated voltage: 24 V DC
  Limiting values: 19.2...30 V DC
  Max. ripple content: ≤ 5 %
  Display of the present voltage: with green LED

Output load capability
  Rated current (permitted continuous load) 5 A
  Miniature fuse, secondary 8.0 A medium time-lag, sand-filled

Max. conductor cross section of the terminals 2.5 mm², plus and minus poles are assigned to two terminals each

Mechanical data

Mounting
  with 4 screws M5

Mechanical dimensions
  Mounting base 110 x 110 mm (135 mm),
  see Fig. 5.9-2, Drilling pattern
  Height (depth if mounted on rear panel) 145 mm

Weight
  4 kg

Cooling
  The power supply unit must be mounted so that the convection air current is not disturbed.

Ambient temperature
  max. 55 °C (with 100 % load)

Standards, regulations
  VDE 0160, transformer according to VDE 0551

Ordering data

Order number 07 NG 34 R1

GJV3 0756 02 R1
5.10 Power Supply Unit 07 NG 35 R1
primary voltage: 230/400 V 3-phase AC, secondary voltage: 24 V DC, 10 A

The 07 NG 35 power supply unit generates a 24 V DC voltage from a three-phase mains voltage of 230 V AC or 400 V AC. The output voltage is gained by using a 3-phase bridge-connected rectifier. Together with a filter capacitor, this guarantees a small ripple content of the voltage. The power supply unit has a load capability of 10 A. It is suitable for applications in electronic control systems. A green LED indicates that the 24 V DC is present.

The secondary voltage is protected by a built-in B-type automatic circuit-breaker. The primary voltage (mains) has to be protected by external fuses.

The electrical connections are made over screw-type terminals. With 3-phase mains voltage of 230 V, the primary windings of the transformer are delta-connected, with 3-phase mains voltage of 400 V, the windings are star-connected (see Fig. 5.10-1). The cables are strain-relieved by cable ties. There is an electrical isolation between the primary and the secondary voltage according to VDE 0551 (safety electrical isolation).

The power supply is fastened by 4 screws M5 (see Fig. 5.10-2, drilling pattern).

The power supply unit must be mounted so that the convection air current is not disturbed.

**Configuration set by the factory:**

![Diagram of power supply unit 07 NG 35 R1](Image)

Fig. 5.10-1: Imprinted circuit diagram and terminal diagrams for 230 V and 400 V 3-phase AC
The power supply unit has a height (depth if mounted on rear panel) of ca. 125 mm

Fig. 5.10-2: Drilling pattern and outline dimensions of the power supply unit
Technical data

Electrical data, input specifications

Primary voltage 230 V 3-phase AC
Rated voltage 230 V 3-phase AC
Limiting values 207...253 V AC
Mains frequency 50 or 60 Hz
Current consumption with no load ca. 0.22 A
with rated load ca. 0.85 A
Fusing primary external

Primary voltage 400 V 3-phase AC
Rated voltage 400 V 3-phase AC
Limiting values 360...440 V AC
Mains frequency 50 or 60 Hz
Current consumption with no load ca. 0.15 A
with rated load ca. 0.50 A
Fusing primary external

Max. conductor cross section of the terminals 2 x 1.5 mm²

Electrical data, output specifications

Secondary voltage (output voltage)
Rated voltage 24 V DC
Limiting values 19.2...30 V DC
Max. ripple content ≤ 2 %
Display of the present voltage with green LED

Output load capability
Rated current (permitted continuous load) 10 A

Fusing, secondary automatic circuit-breaker B 10 A

Max. conductor cross section of the terminals 2 x 4 mm², plus and minus poles are assigned to two terminals each

Mechanical data

Mounting with 4 screws M5

Mechanical dimensions
Mounting base 232 x 175 mm, see Fig. 5.10-2. Drilling pattern
Height (depth if mounted on rear panel) 125 mm

Weight 6 kg

Cooling The power supply unit must be mounted so that the convection air current is not disturbed.

Ambient temperature max. 55 °C (with 100 % load)

Standards, regulations VDE 0160, transformer according to VDE 0551

Ordering data
Order number 07 NG 35 R1 GJ V3 0756 03 R1
5.11 Power Supply Unit 07 NG 36 R1
primary voltage: 230/400 V 3-phase AC, secondary voltage: 24 V DC, 20 A

The 07 NG 36 power supply unit generates a 24 V DC voltage from a three-phase mains voltage of 230 V AC or 400 V AC. The output voltage is gained by using a 3-phase bridge-connected rectifier. Together with a filter capacitor, this guarantees a small ripple content of the voltage. The power supply unit has a load capability of 20 A. It is suitable for applications in electronic control systems. A green LED indicates that the 24 V DC is present.

The secondary voltage is protected by a built-in B-type automatic circuit-breaker. The primary voltage (mains) has to be protected by external fuses.

The electrical connections are made over screw-type terminals. With 3-phase mains voltage of 230 V, the primary windings of the transformer are delta-connected. With 3-phase mains voltage of 400 V, the windings are star-connected (see Fig. 5.11-1). The cables are strain-relieved by cable ties. There is an electrical isolation between the primary and the secondary voltage according to VDE 0551 (safety electrical isolation).

The power supply is fastened by 4 screws M6 (see Fig. 5.11-2, drilling pattern).

The power supply unit must be mounted so that the convection air current is not disturbed.

---

Configuration set by the factory:

230 V 3-phase AC

400 V 3-phase AC

---

Fig. 5.11-1: Imprinted circuit diagram and terminal diagrams for 230 V and 400 V 3-phase AC
These wire straps are assembled by the factory for connection in star-configuration with 400 V 3-phase AC.

3-phase mains connection 230/400 V AC, for details see Fig. 15.14-1

Output voltage 24 V DC, 20 A

Strain relief for mains cable

Strain relief for 24 V cable

Automatic circuit breaker B 20 A

Green LED display: 24 V DC present

The power supply unit has a height (depth if mounted on rear panel) of ca. 136 mm

Fig. 5.11-2: Drilling pattern and outline dimensions of the power supply unit
### Technical data

#### Electrical data, input specifications

<table>
<thead>
<tr>
<th>Primary voltage 230 V 3-phase AC</th>
<th>230 V 3-phase AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>207...253 V AC</td>
</tr>
<tr>
<td>Limiting values</td>
<td>50 or 60 Hz</td>
</tr>
<tr>
<td>Mains frequency</td>
<td>ca. 0.35 A</td>
</tr>
<tr>
<td>Current consumption</td>
<td>primary</td>
</tr>
<tr>
<td>with no load</td>
<td>ca. 1.70 A</td>
</tr>
<tr>
<td>with rated load</td>
<td>external</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary voltage 400 V 3-phase AC</th>
<th>400 V 3-phase AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>360...440 V AC</td>
</tr>
<tr>
<td>Limiting values</td>
<td>50 or 60 Hz</td>
</tr>
<tr>
<td>Mains frequency</td>
<td>ca. 0.25 A</td>
</tr>
<tr>
<td>Current consumption</td>
<td>primary</td>
</tr>
<tr>
<td>with no load</td>
<td>ca. 1.00 A</td>
</tr>
<tr>
<td>with rated load</td>
<td>external</td>
</tr>
</tbody>
</table>

Max. conductor cross section of the terminals

| 2 x 1.5 mm² |

#### Electrical data, output specifications

<table>
<thead>
<tr>
<th>Secondary voltage (output voltage)</th>
<th>24 V DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>19.2...30 V DC</td>
</tr>
<tr>
<td>Limiting values</td>
<td>≤ 2 %</td>
</tr>
<tr>
<td>Max. ripple content</td>
<td>with green LED</td>
</tr>
<tr>
<td>Display of the present voltage</td>
<td></td>
</tr>
</tbody>
</table>

Output load capability

<table>
<thead>
<tr>
<th>Rated current (permitted continuous load)</th>
<th>20 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusing, secondary</td>
<td>automatic circuit-breaker B 20 A</td>
</tr>
<tr>
<td>Max. conductor cross section of the terminals</td>
<td>2 x 4 mm², plus and minus poles are assigned to two terminals each</td>
</tr>
</tbody>
</table>

#### Mechanical data

| Mounting | with 4 screws M6 |
| Mechanical dimensions | |
| Mounting base | |
| Height (depth if mounted on rear panel) | 268 x 200 mm, see Fig. 5.11-2, Drilling pattern 136 mm |
| Weight | 15 kg |
| Cooling | The power supply unit must be mounted so that the convection air current is not disturbed. |
| Ambient temperature | max. 55 °C (with 100 % load) |
| Standards, regulations | VDE 0160, transformer according to VDE 0551 |

#### Ordering data

Order number

| 07 NG 36 R1 | GJV3 0756 04 R1 |
6 Mechanical Data

6.1 Dimensions of Basic Configuration and Extension Modules

Fig. 6.1: 07 KR 220, 07 KR 228 and 07 KT 228

Figure 6.2: 07 KR 240, 07 KT 240 and 07 EA 240
6.2 Dimensions of the Input/Output Modules

Fig. 6.4: 07 EB 200, 07 EB 205, 07 AB 200 and 07 AB 205

Fig. 6.5: 07 EA 200 and 07 AA 200
6.3 Dimensions of the programming units

Fig. 6.6: O7 PG 200 small programming unit

Fig. 6.7: O7 PG 201 universal programming unit
7 Installation and wiring of the system

7.1 Voltage supply (mains)

Supply voltage with the following data are necessary for the various system configurations:

<table>
<thead>
<tr>
<th>Number of I/Os</th>
<th>Features</th>
<th>20</th>
<th>28</th>
<th>40</th>
<th>64</th>
<th>92</th>
<th>104</th>
<th>128</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td></td>
<td>170 V AC</td>
<td>264 V AC</td>
<td>50 - 60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity (VA)</td>
<td>max.</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>75</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>Rush current, peak value (A)</td>
<td>3</td>
<td>3.5</td>
<td>4</td>
<td>4.5</td>
<td>7.4</td>
<td>8</td>
<td>8.5</td>
<td></td>
</tr>
</tbody>
</table>

Supply voltage dropouts less than 20 ms have no effects on the system.
Supply voltage dropouts greater than 60 ms stop a system which is running (RUN contact open). When the supply voltage returns, the system must be restarted with a new start pulse.
All unbuffered flags are returned to the off state, but the buffered flags retain their existing state.

7.2 Voltage supplies for inputs/outputs

7.2.1 DC voltage supply (24 V DC)

This is not required for the basic configurations 07 KR 228 to 07 KR 264. The 24 V DC/0.4 A power supply unit is in each case integrated. If, however, the input modules 07 EB 200 are also used, then an external supply voltage is necessary if there are more than 40 inputs (24 V DC in accordance with system data).
Please note that each input has a capacity of 10 mA.

7.2.2 AC voltage supply (115/230 V AC)

The system does not contain a supply voltage for the input module 07 EB 205. If this module is used, an AC supply voltage should be provided which complies with the system data.

7.2.3 Voltage supplies of the outputs

Please provide a power supply unit which complies with the system data.

Caution: If external power supply units are used, care must be taken that the 0 V terminals of the ABB Procontic K200 and the power supply unit are connected together.

7.3 Ambient conditions

Please select a location in which the following conditions are guaranteed:

a. Ambient temperatures -0°...+55° C
b. The temperature should not vary widely, as this can cause condensation
c. The environment should be free of corrosive and flammable gases. It should also be free of conductive dust or air containing iron
d. Relative humidity from 30 % to 90 %, without condensation
e. The PLC should not be exposed to direct sunlight.

7.4 Installation of the system

Please install the PLC on the basis of the following points:

a. Ensure that there is sufficient ventilation space.
b. Do not install the PLC above devices which generate large amounts of heat.
c. Keep the system sufficiently far (greater than 200 mm) from interference sources and power current lines.
7.5 Mounting the programming unit
07 PG 200 or 07 PG 201 resp.

The programming unit 07 PG 200 or 07 PG 201 resp. can be snapped onto the basic units, held in the hand, or mounted on the front panel (please refer to the figures).

- The flat connection cable is 250 mm long and is plugged into the left side of the basic units 07 KR 220 to 07 KR 284.

- For mounting on the front panel of a cabinet, the following holes must be drilled:

![Diagram showing hole positions]

M4 Taptite screws (self-cutting) are required

7.6 Wiring the 230 V AC supply voltage and
system grounding

- If the mains voltage is subject to major spikes, an isolation transformer should be used.

- The connecting wires for the mains voltage should be thicker than 1.5 mm² and flexible, in order to reduce voltage losses.

- Connect the ground terminal of the ABB Procon- tic K200 to the ground terminal of your cabinet with a flexible wire greater than 1.5 mm². Ensure that all modules are grounded in order to guarantee good EMC compatibility.

- The grounding wire should not be longer than 20 m.

- Each component of the ABB Proconic K200 system should be at least 200 mm in all directions from devices which generates magnetic fields (e.g. solenoid valves, contactors, etc.).
7.7 Terminal Assignment of System

**PROCONTEC K200**

- **07 KR 220**
- **07 KR 228 / 07 KT 228**
- **07 KR 240 / 07 KT 240**
- **07 KR 264**
- **07 EA 264**

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50 - 57: For every output channel the two terminals of the normally open contact are brought out to screw terminals.

*Unused terminals*