SK TU4-PBR-M12-C

PROFIBUS® DP – External Bus Interface

The bus interface may only be installed and commissioned by qualified electricians. An electrician is a person who, because of their technical training and experience, has sufficient knowledge with regard to

- Switching on, switching off, isolating, earthing and marking power circuits and devices,
- Proper maintenance and use of protective devices in accordance with defined safety standards.

⚠️ DANGER

Danger of electric shock

The frequency inverter carries hazardous voltage for up to 5 minutes after being switched off.
- Work must not be carried out unless the frequency inverter has been disconnected from the voltage and at least 5 minutes has elapsed since the mains was switched off!

⚠️ NOTICE

Validity of document

This document is only valid in conjunction with the operating instructions of the respective frequency inverter and the bus communication manual for this bus interface (See overview at end of document). These documents contain all of the information that is required for safe commissioning of the bus interface module and the frequency inverter.

Scope of delivery

| 1 x | Bus interface | SK TU4-PBR-M12-C |
| 4 x | Hexagonal socket screw | M4 x 40 mm |

Accessories required:

| 1 x | Bus connection unit | SK TI4-TU-BUS-C |
|     | TI 275280500 | (Part No.: 275 280 500) |

Usage area

External technology unit for connection of a decentralised frequency inverter (SK 2xxE) to a PROFIBUS DP field bus. The bus interface can be mounted on, or in the immediate vicinity of the frequency inverter. This is connected to the inverter via the system bus, and can directly access up to 4 frequency inverters. 4 digital inputs and 2 digital outputs are available.
## Technical Data

### Bus interface

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature range</td>
<td>-25 °C…50 °C</td>
</tr>
<tr>
<td>Temperature class</td>
<td>Class 3K4</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP66</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 V ± 20 %, ≈ 90 mA Reverse polarity protected</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>3M7</td>
</tr>
<tr>
<td>Firmware version</td>
<td>V1.4 R0</td>
</tr>
<tr>
<td>Hardware version</td>
<td>AA</td>
</tr>
<tr>
<td>Dimensions [mm]*</td>
<td>H x W x D: 95 x 136 x 99</td>
</tr>
</tbody>
</table>

* bus interface fitted to bus connection unit
Depth: 108 mm with cover caps on M12 connection

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital input - working range</td>
<td>Low: 0 V … 5 V, High: 15 V … 30 V</td>
</tr>
<tr>
<td>Digital input - specific data</td>
<td>R_i = 8 kΩ, input capacity: 10 nF, response time 1 ms, inputs as per EN 61131-2 type 1</td>
</tr>
<tr>
<td>Digital output - 24 VDC power supply</td>
<td>≤ 400 mA (input)</td>
</tr>
<tr>
<td>Digital input - working range</td>
<td>Low = 0 V, High = 24 V; max. 200 mA</td>
</tr>
</tbody>
</table>

### Bus specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFIBUS DP</td>
<td>Max. 12 MBit/s</td>
</tr>
<tr>
<td></td>
<td>electrical isolation 500 V_off</td>
</tr>
<tr>
<td>Bus connection</td>
<td>Connection terminals</td>
</tr>
<tr>
<td>Bus termination</td>
<td>via DIP switch on the bus interface</td>
</tr>
<tr>
<td>Status display</td>
<td>10 LEDs</td>
</tr>
<tr>
<td>Topology</td>
<td>Linear bus</td>
</tr>
<tr>
<td>Power setting</td>
<td>PROFIBUS DP-V1</td>
</tr>
<tr>
<td>Cable</td>
<td>Cable type A according to EN 50170 (drilled, shielded two conductor cable)</td>
</tr>
<tr>
<td>Cable length</td>
<td>depending on transmission speed:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bus cable length</th>
<th>Transfer rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 m</td>
<td>500 KBit/s</td>
</tr>
<tr>
<td>200 m</td>
<td>1500 KBit/s</td>
</tr>
<tr>
<td>100 m</td>
<td>3…12 MBit/s</td>
</tr>
</tbody>
</table>

| Shield            | via metal cable lead-in to PE              |
| PE connection     | via PE screw cap in terminal box           |

### Power

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update interval for process data between bus interface and frequency inverter</td>
<td>≈ 5 ms</td>
</tr>
<tr>
<td>Parameter read access on the frequency inverter</td>
<td>≈ 12 ms</td>
</tr>
<tr>
<td>Parameter write access with storage in EEPROM</td>
<td>≈ 25 ms</td>
</tr>
</tbody>
</table>
Bus interface characteristics

<table>
<thead>
<tr>
<th>Communication</th>
<th>Cyclic useful data connection between DP master and DP slaves (point-to-point useful data communication or Multicast)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance levels DP-V0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication</th>
<th>Acyclic data communication between DP master DPM1 and DP slaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance levels DP-V1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transfer Method</th>
<th>RS485</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Addressing</th>
<th>SK TU3-PBR</th>
<th>SK TU3-PBR-24V</th>
<th>SK xU4-PBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter P508 at frequency inverter</td>
<td>Rotary coding switch or parameter P508 at frequency inverter</td>
<td>DIP switch or parameter P160</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Synchronisation</th>
<th>Sync mode (synchronisation of outputs) and Freeze mode (synchronisation of inputs)</th>
</tr>
</thead>
</table>

| Bus access | • Token Passing procedure  
|------------|----------------------------------------------------------------------------------|
|            | • Master/Slave procedure  
|            | • Mono-Master or Multi-Master System  
| Access for NORD diagnosis tool via | diagnostics socket on the device (if available) and via frequency inverter |

Installation

The bus interface must be attached to a suitable connection unit (SK TI4-TU…) and connected using the 4 provided M4 x 40 mm hexagon socket collar screws. Installation details can be found in the data sheet for the relevant connection units.
Connections

The connection of the field bus lines, signal lines and control lines takes place via the bus connection unit SK T14-TU-BUS(-C).

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Double-sprung terminal bar</th>
<th>2 x 18 contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable cross section</td>
<td>AWG 14-26</td>
<td>rigid: 0.14 … 2.5 mm flexible: 0.14 … 1.5 mm with wire end sleeves</td>
</tr>
<tr>
<td>PE connection</td>
<td>Via housing</td>
<td></td>
</tr>
<tr>
<td>RJ12</td>
<td>RJ45 - socket</td>
<td>Interface for connecting a parameterisation tool</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potential</th>
<th>Contact</th>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>PROFIBUS DP</td>
<td>Supply potential (+24 V ±20%, 90 mA)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>3</td>
<td>PB B IN</td>
<td>Receive line, positive</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>PB B OUT</td>
<td>Transmit line, positive</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>PB A IN</td>
<td>Receive line, negative</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>PB A OUT</td>
<td>Transmit line, negative</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0V-B</td>
<td>Bus reference potential</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0V-B</td>
<td>Bus reference potential</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>RTS</td>
<td>Ready to send</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>+5 V B</td>
<td>+5 V bus supply voltage</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>SYS +</td>
<td>System bus data line +</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>SYS -</td>
<td>System bus data line -</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>0V GND</td>
<td>Reference potential (0 V/GND)</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>0V GND</td>
<td>Reference potential (0 V/GND)</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>DIG 1</td>
<td>Digital input 1</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>DIG 2</td>
<td>Digital input 2</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td>Reference potential (0 V/GND)</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td>Reference potential (0 V/GND)</td>
</tr>
<tr>
<td>19</td>
<td></td>
<td>DIG 4</td>
<td>Digital input 4</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td>Reference potential (0 V/GND)</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td>Reference potential (0 V/GND)</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td>Supply potential (+24 V)</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>29</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>31</td>
<td></td>
<td></td>
<td>Supply voltage (+24 V)</td>
</tr>
<tr>
<td>32</td>
<td>0 V 2</td>
<td></td>
<td>Reference potential (0 V / GND) of the digital outputs</td>
</tr>
<tr>
<td>33</td>
<td>DO 1</td>
<td>Digital output 1 (+24 V, 500 mA)</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>DO 2</td>
<td>Digital output 2 (+24 V, 500 mA)</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>0 V 2</td>
<td></td>
<td>Reference potential (0 V / GND) of the digital outputs</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td></td>
<td>Reference potential (0 V / GND) of the digital outputs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>RJS4526_A</th>
<th>Data cable RS485</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJS4526_B</td>
<td>Data cable RS485</td>
<td></td>
</tr>
<tr>
<td>RJS4526_G</td>
<td>Reference potential (GND)</td>
<td></td>
</tr>
<tr>
<td>RJS4526_R</td>
<td>Data cable RS232</td>
<td></td>
</tr>
<tr>
<td>RJS4526_X</td>
<td>Data cable RS232</td>
<td></td>
</tr>
<tr>
<td>RJS4526_Y</td>
<td>24 V Supply voltage (+24 V)</td>
<td></td>
</tr>
</tbody>
</table>
### Connection examples

<table>
<thead>
<tr>
<th>Connection of voltage supply and Systembus</th>
<th>24 V DC</th>
<th>GND/0V</th>
<th>Systembus+</th>
<th>Systembus-</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI 24V</td>
<td>Brown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GND/0V</td>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYS+</td>
<td>Black</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYS-</td>
<td>Grey</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As an alternative to connecting to the bus connection unit, up to 4 sensors (digital inputs DI1…DI4) and up to 2 actuators (digital outputs DO1…DO2) can be connected via the M12 sockets at the front of the bus interface with normal commercial M12 system connectors. Contacts 19, 20, 25, 26, 33 and 34 of the bus connecting unit may not be used in this case.
Configuration

The PROFIBUS address of the bus interface (1) is set via the DIP switches. If the bus interface is the final subscriber on the PROFIBUS field bus or the NORD system bus, the terminating resistors (2) and (3) must be activated.

The DIP switch settings are read in after a “Power On” of the bus interface.

<table>
<thead>
<tr>
<th>DIP switch</th>
<th>Meaning</th>
<th>Department</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>—</td>
<td>Addressing</td>
<td>Bus interface PROFIBUS address</td>
</tr>
<tr>
<td>7</td>
<td>Address bit 6</td>
<td>Addressing</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Address bit 5</td>
<td>Addressing</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Address bit 4</td>
<td>Addressing</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Address bit 3</td>
<td>Addressing</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Address bit 2</td>
<td>Addressing</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Address bit 1</td>
<td>Addressing</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Address bit 0</td>
<td>Addressing</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PB Term.</td>
<td>Bus terminal</td>
<td>Terminating resistor for PROFIBUS field bus</td>
</tr>
<tr>
<td>2</td>
<td>PB Term.</td>
<td>Bus terminal</td>
<td>Terminating resistor for NORD system bus</td>
</tr>
<tr>
<td>1</td>
<td>S-Bus Term.</td>
<td>Bus terminal</td>
<td></td>
</tr>
</tbody>
</table>

1. Addressing (DIP 7 ... 1)
   The PROFIBUS is set with binary coding using DIP switches 7...1. Address area "3"..."125".

2. Terminating resistors for PROFIBUS field bus (DIP 2 and 3).
   Both DIP switches 2 and 3 must be moved to the “ON” position if the bus interface is the final subscriber on the bus.

3. Termination resistor for NORD system bus (DIP 1)
   Set DIP switch 1 to the “ON” position if the bus interface is the final subscriber on the bus.
LED indicators

The operating statuses of the bus interface are visualised using LED indicators.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Colour</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EN</td>
<td>red</td>
<td>Device error</td>
</tr>
<tr>
<td></td>
<td>DS</td>
<td>green</td>
<td>Device State</td>
</tr>
<tr>
<td>2</td>
<td>BE</td>
<td>red/green</td>
<td>PROFIBUS DP Error</td>
</tr>
<tr>
<td></td>
<td>BR</td>
<td>green</td>
<td>PROFIBUS DP Status</td>
</tr>
</tbody>
</table>

**PROFIBUS DP-specific LED**

<table>
<thead>
<tr>
<th>BR (Bus Ready, PROFIBUS DP Status)</th>
<th>BE (Bus Error, PROFIBUS DP Error)</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>Bus interface not ready, no voltage supply or signalling of a system fault via the “DS” and “DE” LEDs.</td>
</tr>
<tr>
<td>Steady illumination in green</td>
<td>OFF</td>
<td>Normal operation, cyclic data exchange via PROFIBUS DP.</td>
</tr>
<tr>
<td>Flashing green (0.5 s)</td>
<td>OFF</td>
<td>Technology unit has not been configured by the DP master, no cyclic data exchange:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PROFIBUS DP cable not connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Addressing error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PROFIBUS DP-Master in &quot;STOP&quot; state</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Defective hardware configuration (e.g. More than 4 connected frequency inverters)</td>
</tr>
<tr>
<td>Steady</td>
<td>Steady</td>
<td>Communication timeout: Address monitoring time in PROFIBUS DP master expired.</td>
</tr>
<tr>
<td>illumination in red</td>
<td>illumination in red</td>
<td></td>
</tr>
<tr>
<td>Steady</td>
<td>Flashing red (0.5 s)</td>
<td>Timeout during process data reception: The time set in parameter <strong>P151 External bus timeout</strong> has elapsed without new process data being received.</td>
</tr>
<tr>
<td>Steady</td>
<td>Flashing red (0.5 s)</td>
<td>No communication between bus interface and PROFIBUS DP master:</td>
</tr>
<tr>
<td>illumination in red</td>
<td>Flashing red (0.5 s)</td>
<td>• Incorrect address range (permitted range &quot;3&quot;...&quot;125&quot;)</td>
</tr>
<tr>
<td></td>
<td>Flashing red (0.5 s)</td>
<td>• Bus interface defective</td>
</tr>
</tbody>
</table>
### NORD-specific LEDs

<table>
<thead>
<tr>
<th>LED (yellow)</th>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI1</td>
<td>ON</td>
<td>&quot;High&quot; potential present at terminal 19 or M12 socket &quot;DI1&quot;.</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>&quot;Low&quot; potential present at terminal 19 or M12 socket &quot;DI1&quot;.</td>
</tr>
<tr>
<td>DI2</td>
<td>ON</td>
<td>&quot;High&quot; potential present at terminal 25 or M12 socket &quot;DI2&quot;.</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>&quot;Low&quot; potential present at terminal 25 or M12 socket &quot;DI2&quot;.</td>
</tr>
<tr>
<td>DI3</td>
<td>ON</td>
<td>&quot;High&quot; potential present at terminal 20 or M12 socket &quot;DI3&quot;.</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>&quot;Low&quot; potential present at terminal 20 or M12 socket &quot;DI3&quot;.</td>
</tr>
<tr>
<td>DI4</td>
<td>ON</td>
<td>&quot;High&quot; potential present at terminal 26 or M12 socket &quot;DI4&quot;.</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>&quot;Low&quot; potential present at terminal 26 or M12 socket &quot;DI4&quot;.</td>
</tr>
<tr>
<td>DO1</td>
<td>ON</td>
<td>&quot;High&quot; potential output at terminal 33 or M12 socket &quot;DO1&quot;.</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>&quot;Low&quot; potential output at terminal 33 or M12 socket &quot;DO1&quot;.</td>
</tr>
<tr>
<td>DO2</td>
<td>ON</td>
<td>&quot;High&quot; potential output at terminal 34 or M12 socket &quot;DO2&quot;.</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>&quot;Low&quot; potential output at terminal 34 or M12 socket &quot;DO2&quot;.</td>
</tr>
</tbody>
</table>

### Digital input and output LEDs

<table>
<thead>
<tr>
<th>LED (yellow)</th>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS</td>
<td>OFF</td>
<td>Bus interface not ready, no control voltage</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>Bus interface ready, no error, at least one frequency inverter is communicating via the system bus</td>
</tr>
<tr>
<td>ON</td>
<td>Short flashing</td>
<td>Bus interface ready, but</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• One or more of the connected frequency inverters has fault status</td>
</tr>
<tr>
<td>Long flashing</td>
<td>OFF</td>
<td>Bus interface ready and at least one other subscriber is connected to the system bus, but</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No frequency inverter on the system bus (or connection interrupted)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• One or more system bus subscriber has an address error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Software incompatible (bus interface software and FI software incompatible - update required)</td>
</tr>
<tr>
<td>Long flashing</td>
<td>Short flashing</td>
<td>System bus is in status &quot;Bus Warning&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Communication on system bus disrupted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No other subscribers present on system bus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Module not inserted correctly or no connection to system bus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Frequency inverter has no supply voltage</td>
</tr>
<tr>
<td>Long flashing</td>
<td>Short flashing</td>
<td>System bus is in status &quot;Bus Off&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The system bus 24 V power supply has been interrupted during operation</td>
</tr>
<tr>
<td>Long flashing</td>
<td>Short flashing</td>
<td>System bus is in status &quot;Bus Off&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The 24 V voltage supply of the system bus is missing</td>
</tr>
<tr>
<td>Long flashing</td>
<td>Short flashing</td>
<td>Bus interface error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• See parameter P170</td>
</tr>
<tr>
<td>OFF</td>
<td>Short flashing</td>
<td>System error, internal program sequence interrupted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• EMC interference (observe the wiring guidelines!)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bus interface defective</td>
</tr>
</tbody>
</table>
Error messages

Error messages from the bus interface – current or archived messages relating to the last fault - can be read out via module parameter P170 (SK xU4-PBR only). The error messages are lost if the bus interface is switched off.

<table>
<thead>
<tr>
<th>Error</th>
<th>Meaning</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>100.0</td>
<td>EEPROM error</td>
<td>EMC faults, bus interface defective</td>
</tr>
<tr>
<td>101.0</td>
<td>System bus 24 V missing</td>
<td>No 24 V voltage on bus, connections not correct</td>
</tr>
<tr>
<td>102.0</td>
<td>Bus timeout P151</td>
<td>By means of timeout supervision parameter P151/P513</td>
</tr>
<tr>
<td>103.0</td>
<td>System bus BUS OFF</td>
<td>No 24 V supply to the bus, connections not correct</td>
</tr>
<tr>
<td>500.0</td>
<td>PROFIBUS ASIC error</td>
<td>No communication with ASIC</td>
</tr>
<tr>
<td>501.0</td>
<td>PROFIBUS address incorrect</td>
<td>Address outside permissible range (3…125)</td>
</tr>
<tr>
<td>502.0</td>
<td>PROFIBUS Timeout</td>
<td>Telegram transfer error</td>
</tr>
</tbody>
</table>

Bus interface-related errors are depicted as follows in the error memory of the frequency inverter (P700 / P701).

<table>
<thead>
<tr>
<th>Error (E010)</th>
<th>Meaning</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.0</td>
<td>Connection error</td>
<td>Contact to bus interface lost</td>
</tr>
<tr>
<td>10.2</td>
<td>PROFIBUS telegram failure</td>
<td>Telegram transfer error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the connections and links, program sequence and Bus Master.</td>
</tr>
<tr>
<td>10.3</td>
<td>Timeout by P151/P513</td>
<td>Telegram transfer error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check watchdog time (P151).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the connections and links in the program sequence in the Bus Master.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The release bit is missing in the control word.</td>
</tr>
<tr>
<td>10.4</td>
<td>External bus interface initialisation error</td>
<td>Unable to address bus interface.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check parameter P746 setting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check power supply of bus interface.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the connections and links.</td>
</tr>
<tr>
<td>10.8</td>
<td>External bus interface communication error</td>
<td>Only SK TU3-PBR bus interface:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connection between bus interface and frequency inverter interrupted.</td>
</tr>
<tr>
<td>10.9</td>
<td>Missing bus interface</td>
<td>Only bus interfaces SK CU4-PBR and SK TU4-PBR:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connection between bus interface and frequency inverter interrupted. (see setting of parameter P120).</td>
</tr>
</tbody>
</table>
Parameter

**Frequency inverter:** The following frequency inverter parameters must be adapted for setting up communication between the frequency inverter and the bus interface (for details please refer to the frequency inverter manual).

<table>
<thead>
<tr>
<th>Parameter [ -Array]</th>
<th>Meaning</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>P120 [-01]</td>
<td>Option monitoring</td>
<td>&quot;Auto&quot; (default setting)</td>
</tr>
<tr>
<td>P509</td>
<td>Source Control Word</td>
<td>SK TU3... on SK 5xxE: &quot;Profibus&quot; SK xU4... on SK 180/SK 2xxE: &quot;System bus&quot;</td>
</tr>
<tr>
<td>P510 [-01]...[-02]</td>
<td>Setpoint source</td>
<td>&quot;Auto&quot; (default setting)</td>
</tr>
<tr>
<td>P513</td>
<td>Time-out</td>
<td>Monitoring of the SK TU3 bus interface</td>
</tr>
<tr>
<td>P543...[03] and P543...[05]</td>
<td>Bus actual value (1...3)</td>
<td>Possible settings according to P418</td>
</tr>
<tr>
<td>P546...[01]...[03]</td>
<td>Bus setpoint value (1...3)</td>
<td>Possible settings according to P400</td>
</tr>
<tr>
<td>P700/ P701</td>
<td>Current/last faults</td>
<td>Information parameter</td>
</tr>
<tr>
<td>P740/ P741</td>
<td>Process data bus In / Out</td>
<td>Information parameter</td>
</tr>
<tr>
<td>P745</td>
<td>Module version</td>
<td>Information parameter</td>
</tr>
<tr>
<td>P746</td>
<td>Module status</td>
<td>Information parameter</td>
</tr>
<tr>
<td>P748</td>
<td>CANopen/System bus status</td>
<td>Information parameter</td>
</tr>
</tbody>
</table>

**Bus interface:** The bus interface provides a selection of appropriate parameters for setting or displaying special operating values. Parameters can be adapted using the NORDCON software or an SK PAR-3H / -3E parameter box. All parameters can still be read and written by the bus master via PROFIBUS DP.

<table>
<thead>
<tr>
<th>Parameter [ -Array]</th>
<th>Meaning</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>P150</td>
<td>Set relays</td>
<td>Set DOUT directly or control via BUS</td>
</tr>
<tr>
<td>P151</td>
<td>External bus time-out</td>
<td>Monitoring of SK xU4 bus interface</td>
</tr>
<tr>
<td>P152</td>
<td>Factory setting</td>
<td>Reset bus interface parameters</td>
</tr>
<tr>
<td>P153[-01]...[02]</td>
<td>Minimum system bus cycle</td>
<td>Reduction of bus load on the system bus caused by the bus interface</td>
</tr>
<tr>
<td>P154[-01]...[02]</td>
<td>Access to option card I/O</td>
<td>Administration of read and write rights to the IO of the module</td>
</tr>
<tr>
<td>P160</td>
<td>Profibus address</td>
<td>Set bus interface PROFIBUS-DP address</td>
</tr>
<tr>
<td>P170[-01]...[02]</td>
<td>Present errors</td>
<td>Display bus interface errors</td>
</tr>
<tr>
<td>P171[-01]...[03]</td>
<td>Software version</td>
<td>Firmware version/Revision</td>
</tr>
<tr>
<td>P172</td>
<td>Configuration</td>
<td>Bus interface type</td>
</tr>
<tr>
<td>P173</td>
<td>Module status</td>
<td>Status of system bus or the connected FI</td>
</tr>
<tr>
<td>P174</td>
<td>Status of digital inputs</td>
<td>Image of the switching status of DIN</td>
</tr>
<tr>
<td>P175</td>
<td>Digital output state</td>
<td>Image of the switching status of DOUT</td>
</tr>
<tr>
<td>P176[-01]...[-17]</td>
<td>Process data bus In</td>
<td>Information parameter</td>
</tr>
<tr>
<td>P177[-01]...[-17]</td>
<td>Process data bus Out</td>
<td>Information parameter</td>
</tr>
<tr>
<td>P180</td>
<td>Profibus address</td>
<td>Information parameter</td>
</tr>
<tr>
<td>P181</td>
<td>Profibus baud rate</td>
<td>Information parameter</td>
</tr>
<tr>
<td>P182</td>
<td>PPO Type</td>
<td>Information parameter</td>
</tr>
</tbody>
</table>
Parameter access and diagnostics

The NORD CON software and optional control units such as the SK PAR-3H parameter box provide convenient access to the parameters of the bus interface and allow status information to be read out.

<table>
<thead>
<tr>
<th>SK TU3-</th>
<th>SK TU4-</th>
<th>SK CU4- / SK TU4-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access via RJ12 diagnostics</td>
<td>Access via RJ12 diagnostics</td>
<td>Access via RJ12 frequency</td>
</tr>
<tr>
<td>socket of the SK 5xxE</td>
<td>socket of the bus connection</td>
<td>inverter diagnostics socket, if</td>
</tr>
<tr>
<td></td>
<td></td>
<td>connected to the bus interface via</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the system bus.</td>
</tr>
</tbody>
</table>

Further documentation and software (www.nord.com)

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSD-file</td>
<td>Device characteristics and parameters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Document</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BU 0000</td>
<td>Description of NORD CON software</td>
</tr>
<tr>
<td>BU 0040</td>
<td>Parameter box manual</td>
</tr>
<tr>
<td>BU 0180</td>
<td>Frequency inverter manual SK 180E, SK 190E</td>
</tr>
<tr>
<td>BU 0200</td>
<td>Frequency inverter manual SK 2xxE</td>
</tr>
<tr>
<td>BU 2700</td>
<td>PROFINET DP bus communication manual</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORD CON</td>
<td>Parametrization and diagnostic software</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Document</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TI 275280500</td>
<td>Bus connection unit SK T4-TU-BUS-C</td>
</tr>
<tr>
<td>TI 275274505</td>
<td>SK TIE4-M12-SYSS System bus connection expansion exit</td>
</tr>
<tr>
<td>TI 275274506</td>
<td>SK TIE4-M12-SYSS System bus connection expansion entrance</td>
</tr>
<tr>
<td>TI 275274500</td>
<td>SK TIE4-M12-PRB Ethernet connection expansion PROFIBUS DP input/output</td>
</tr>
</tbody>
</table>