

## SK TU4-IOE

Part Number 275 281 106

### IO Extension

Only qualified electricians are allowed to install and commission the module described below. 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 (See overview at end of document). Safe commissioning of this module and the frequency inverter depends on the availability of this information.

### Scope of supply

|                             |                                     |   |
|-----------------------------|-------------------------------------|---|
| 1 x                         | Module                              | SK TU4-IOE                              |
| 4 x                         | Hexagon socket                      | M4 x 40 mm                              |
| 1 x                         | System bus cable set                | grey / black                            |
| 1 x                         | 24 VDC cable set                    | brown / blue                            |
| 1 x                         | PE cable                            | green / yellow                          |
| <i>Required accessories</i> |                                     |   |
| 1 x                         | Bus connection unit<br>TI 275280000 | SK TI4-TU-BUS<br>(Part No. 275 280 000) |



### Field of use

External IO extension for mounting on, or in the immediate vicinity of a decentralised frequency inverter (**SK 1x0E** / **SK 2xxE**). This can be connected to the frequency inverter via the system bus. Four digital inputs, 2 digital outputs, 2 analog inputs and 1 analog output are available.

| Technical Information / Datasheet | SK TU4-IOE   |       |      |    |
|-----------------------------------|--------------|-------|------|----|
| IO-Extension                      | TI 275281106 | V 1.4 | 3517 | en |

### Technical Data

|                   |                  |
|-------------------|------------------|
| Temperature range | -25 °C ... 50 °C |
| Temperature class | Class 3K3        |
| Protection class  | IP55             |

|                      |                     |
|----------------------|---------------------|
| Vibration resistance | 3M7                 |
| Firmware version     | V1.3 R0             |
| Dimensions [mm]*     | HxWxD 95 x 136 x 91 |

\* Module mounted on the BUS connection unit

| Name                                      | Terminal    | Data  |
|---|-------------|---|
| Module power supply (load capacity)       | 15+11       | 24 VDC $\pm$ 20 %, reverse polarity protected ( $\leq$ 3 A)   |
| Power consumption of module               | 15+11       | 140 mA  |
| Digital input - operating range           | 19/20/25/26 | Low: 0 V ... 5 V, High: 15 V ... 30 V   |
| Digital input - specific information      | 19/20/25/26 | $R_i = 8,1 \text{ k}\Omega$ , input capacitance: 10nF<br>Scan rate 1 ms, reaction time 1 ms   |
| Digital output - 24 VDC power supply      | 35+31       | $\leq 1000 \text{ mA}$ (input)  |
| Digital output - operating range          | 33/34       | Low = 0 V, High = 24 V; max. 500 mA   |
| Analog input - reference voltage          | 1           | 10 VDC $\pm 0,1 \text{ V}$ , $\leq 20 \text{ mA}$ (output)  |
| Analog input - differential input version | 3+5; 4+6    | Resolution: 12 Bit, accuracy: 0.1 V,<br>Load resistance 250 $\Omega$ (Connection via<br>DIP switch when configuration as a current<br>input.) |
| Analog input - load capacity              | 3+5; 4+6    | $\leq 10 \text{ mA}$ (mode: 0/2 ... 10 V)<br>$\leq 20 \text{ mA}$ (mode: 0/4 ... 20 mA)   |
| Analog output - load capacity             | 9           | $\geq 1 \text{ k}\Omega$ (Mode: 0/2 ... 10 V)<br>$\leq 250 \Omega$ (Mode: 0/4 ... 20 mA)  |
| Analog output - specific information      | 9           | Resolution: 10 Bit, accuracy: 0.25 V  |

### 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

Connection of the signal and control cables is made via the connection unit SK TI4-TU-BUS.

|                     |                            |   |
|---------------------|----------------------------|---|
| Terminals           | Double-sprung terminal bar | 2 x 18 contacts   |
| Cable cross section | AWG 14-26                  | rigid: 0,14 ... 2,5 mm<br>flexible: 0.14 ... 1.5 mm with wire end sleeves |
| PE connection       | Via housing                |   |
| RJ12                | RJ45 - socket              | Interface for connecting a parameterisation tool                          |

| Potential                           | Contact  | Designation | Description  |
|-------------------------------------|----------|-------------|--|
| Analog IOs                          | 1        | VO 10V      | 10 V Reference voltage                               |
|                                     | 2        | VO 10V      | 10 V Reference voltage                               |
|                                     | 3        | AIN1+       | Analog input 1, positive                             |
|                                     | 4        | AIN2+       | Analog input 2, positive                             |
|                                     | 5        | AIN1-       | Analog input 1, negative                             |
|                                     | 6        | AIN2-       | Analog input 2, negative                             |
|                                     | 7        | AGND/0V     | Analog Ground (internally connected to terminal 40)* |
|                                     | 8        | AGND/0V     | Analog Ground (internally connected to terminal 40)* |
|                                     | 9        | AOUT        | Analog output  |
|                                     | 10       | PE          | PE   |
| System bus level and digital inputs | 11       | VI 24V      | Supply voltage (+24 V - in)                          |
|                                     | 12       | VI 24V      | Supply voltage (+24 V - in)                          |
|                                     | 13       | VI 24V      | Supply voltage (+24 V - in)                          |
|                                     | 14       | SYS +       | System bus data cable +                              |
|                                     | 15       | GND/0V      | Reference potential (0 V / GND)                      |
|                                     | 16       | SYS -       | System bus data cable -                              |
|                                     | 17       | GND/0V      | Reference potential (0 V / GND)                      |
|                                     | 18       | GND/0V      | Reference potential (0 V / GND)                      |
|                                     | 19       | DIN1        | Digital input 1                                      |
|                                     | 20       | DIN3        | Digital input 3                                      |
|                                     | 21       | GND/0V      | Reference potential (0 V / GND)                      |
|                                     | 22       | GND/0V      | Reference potential (0 V / GND)                      |
|                                     | 23       | VI 24V      | Supply voltage (+24 V - in)                          |
|                                     | 24       | VI 24V      | Supply voltage (+24 V - in)                          |
|                                     | 25       | DIN2        | Digital input 2                                      |
|                                     | 26       | DIN4        | Digital input 4                                      |
|                                     | 27       | GND/0V      | Reference potential (0 V / GND)                      |
|                                     | 28       | GND/0V      | Reference potential (0 V / GND)                      |
|                                     | 29       | VI 24V      | Supply voltage (+24 V - in)                          |
|                                     | 30       | VI 24V      | Supply voltage (+24 V - in)                          |
| Digital outputs                     | 31       | VI 24V2     | Supply voltage (+24 V - in) for digital outputs      |
|                                     | 32       | GND2/0V2    | Reference potential (0 V / GND) of digital outputs   |
|                                     | 33       | DOUT1       | Digital output 1                                     |
|                                     | 34       | DOUT2       | Digital output 2                                     |
|                                     | 35       | GND2/0V2    | Reference potential (0 V / GND) of digital outputs   |
|                                     | 36       | GND2/0V2    | Reference potential (0 V / GND) of digital outputs   |
| Diagnostic socket                   | RJ12 - 1 | RS485_A     | Data cable RS485                                     |
|                                     | RJ12 - 2 | RS485_B     | Data cable RS485                                     |
|                                     | RJ12 - 3 | GND         | Reference potential (GND)                            |
|                                     | RJ12 - 4 | RS232_TxD   | Data cable RS232                                     |
|                                     | RJ12 - 5 | RS232_RxD   | Data cable RS232                                     |
|                                     | RJ12 - 6 | 24 V        | Supply voltage (+24 V)                               |

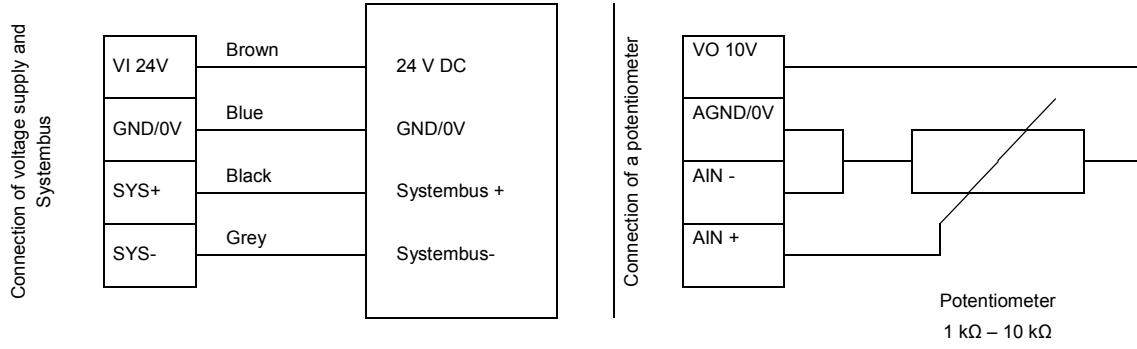
\* AGND/0V is internally connected to the reference voltage of the module GND/0V via a special component. In order to prevent damage to the module or faults in the analog signals, the two contacts must not be bridged



### Potential level

- 1 = Analog IOs
- 2 = System bus + DIN
- 3 = DOUT
- 4 = Diagnosis

**Connection examples**



## Configuration

Configuration of the module is mainly performed via the DIP switches. The DIP switches are read after a "power on" of the module. A change to the DIP switch during operation has no effect.

The system bus must be terminated at both of its physical ends (if necessary set the "System bus termination resistor" DIP switch).



### Note

### Broadcast mode

In "Broadcast mode, which is activated via the parameter (**P162**), the module can access up to 4 inverters in parallel. Therefore the frequency inverters jointly access the I/Os and evaluate the input signals according to their own parameterisation. Output signals from the frequency inverters which are sent to the common IO module are linked by a logical "OR" within the module. i.e. a digital output is set as soon as one of the four frequency inverters addresses it. In addition, the highest analog value is provided via the analog output of the IO extension.

### DIP switches

| Function                        | DIP-Switch Meaning<br>(DIP-No.) | DIP-Switch Combinations |        |        | Assignment Signal  |
|---------------------------------|---------------------------------|-------------------------|--------|--------|--|
|                                 |                                 | BIT2                    | BIT1   | BIT0   |  |
| System bus termination resistor | S-Bus Term.<br>(01)             |                         |        | 0<br>1 | not set<br>setting   |
| Addressing system bus           | S-Bus Adr. Bit 0<br>(02)        |                         | 0<br>0 | 0<br>1 | Adr. 20 (for FI 0 Adr. 32)*<br>Adr. 21 (for FI 1 Adr. 34)* |
|                                 | S-Bus Adr. Bit 1<br>(03)        |                         | 1<br>1 | 0<br>1 | Adr. 22 (for FI 2 Adr. 36)*<br>Adr. 23 (for FI 3 Adr. 38)* |
| Analog input<br>AIN1            | Ain1 Mode Bit 0<br>(04)         | 0<br>0                  | 0<br>0 | 0<br>1 | 0 ... 10 V<br>2 ... 10 V                                   |
|                                 | Ain1 Mode Bit 1<br>(05)         | 0<br>1                  | 1<br>0 | 0<br>0 | -10 ... 10 V<br>0 ... 20 mA                                |
|                                 | Ain1 Mode Bit 2<br>(06)         | 1                       | 0      | 1      | 4 ... 20 mA  |
|                                 |                                 |                         |        |        |  |
| Analog input<br>AIN2            | Ain2 Mode Bit 0<br>(07)         | 0<br>0                  | 0<br>0 | 0<br>1 | 0 ... 10 V<br>2 ... 10 V                                   |
|                                 | Ain2 Mode Bit 1<br>(08)         | 0<br>1                  | 1<br>0 | 0<br>0 | -10 ... 10 V<br>0 ... 20 mA                                |
|                                 | Ain2 Mode Bit 2<br>(09)         | 1                       | 0      | 1      | 4 ... 20 mA  |
|                                 |                                 |                         |        |        |  |
| Analog output<br>AOUT           | Aout Mode Bit 0<br>(10)         |                         | 0<br>0 | 0<br>1 | 0 ... 10 V<br>2 ... 10 V                                   |
|                                 | Aout Mode Bit 1<br>(11)         |                         | 1<br>1 | 0<br>1 | 0 ... 20 mA<br>4 ... 20 mA                                 |
|                                 |                                 |                         |        |        |  |
| Mode<br>Second - IOE            | 2nd IOE Mode<br>(12)            |                         |        | 0<br>1 | First SK-...-IOE on FI<br>Second SK-...-IOE on FI          |

\* With DIP12 = ON: Address 10 ... 13 instead of 20 ... 23

## LED Displays

| DS<br>(Device State) | DE<br>(Device Error)                                 | Meaning   |
|----------------------|--|---|
|                      |  | Long flashing = 0.5 s on / 1 s off<br>Short flashing = 0.25 s on / 1 s off  |
| OFF                  | OFF  | Technology unit not ready, no control voltage   |
| ON                   | OFF  | Technology unit ready, no error, at least one frequency inverter is communicating via the system bus  |
| ON                   | Short flashing                                       | Technology unit ready, however <ul style="list-style-type: none"> <li>One or more of the connected frequency inverters is in fault status</li> </ul>  |
| Long flashing        | OFF  | Technology unit ready and at least one further participant is connected to the system bus, but <ul style="list-style-type: none"> <li>No frequency inverter on the system bus (or connection interrupted)</li> <li>Address error for one or more system bus participants</li> </ul> |
| Long flashing        | Short flashing<br>Flash interval<br>1 x - 1s pause   | System bus is in status "Bus Warning" <ul style="list-style-type: none"> <li>Communication on system bus interrupted or</li> <li>No other participant present on the system bus</li> </ul>  |
| Long flashing        | Short flashing<br>Flash interval<br>2 x - 1s pause   | <ul style="list-style-type: none"> <li>System bus is in status "Bus off" or</li> <li>The system bus 24V power supply was interrupted during operation</li> </ul>  |
| Long flashing        | Short flashing<br>Flash interval<br>3 x - 1s pause   | <ul style="list-style-type: none"> <li>No system bus 24V power supply (system bus is in status "Bus off")</li> </ul>  |
| Long flashing        | Short flashing<br>Flash interval<br>4 x - 1s pause   | Module error <ul style="list-style-type: none"> <li>EEPROM error</li> </ul>   |
| Long flashing        | Short flashing<br>Flash interval<br>5 x - 1s pause   | Module error <ul style="list-style-type: none"> <li>AOUT error (analog output)</li> <li>DIP switch configuration error</li> </ul>   |
| OFF                  | Short flashing<br>Flash interval<br>1...7 - 1s pause | System error, internal program sequence interrupted <ul style="list-style-type: none"> <li>EMC interference (observe wiring guidelines!)</li> <li>Module faulty</li> </ul>  |

| IO channel | Display | Meaning             |
|------------|---------|---------------------|
| DI 1       | ON      | High potential DIN1 |
| DI 2       | ON      | High potential DIN2 |
| DI 3       | ON      | High potential DIN3 |
| DI 4       | ON      | High potential DIN4 |

| IO channel | Display | Meaning              |
|------------|---------|----------------------|
| DO 1       | ON      | High potential DOUT1 |
| DO 2       | ON      | High potential DOUT2 |

DI 3/4, DO 1/2 Available according to the type of IO module

## Error messages

Error messages for the module - the present or archived messages for the last error - can be read out via the module parameter (P170).

| Error | Meaning                              | Comments  |
|-------|--------------------------------------|---|
| 1000  | EEPROM error                         | EMC fault, module defective                                   |
| 1030  | System bus OFF                       | No 24 V supply to bus, connections not correct                |
| 2000  | DIP switch changed                   | DIP switch configuration changed during operation             |
| 2001  | DIP switch configuration incorrect   | Invalid DIP switch settings                                   |
| 2010  | Error at analog output               | Overload, reference voltage, short-circuit, calibration error |
| 2020  | Inverter does not support the module | Incorrect inverter type connected                             |

### Parameterisation

Inverter: In order to establish communication between the inverter and the IOE module, the following inverter parameters must be changed.

| Parameter        | Meaning                      | Comments   |
|------------------|------------------------------|--|
| (P514)           | Bus speed                    | 5 (= 250 kBaud)                                      |
| (P515 [-01])     | Bus address                  | FI 1 = 32      FI 2 = 34<br>FI 3 = 36      FI 4 = 38 |
| (P480 [-01 ...]) | DIN function of the device   | Possible settings according to (P420)                |
| (P481 [-05 ...]) | DOOUT function of the device | Possible settings according to (P434)                |
| (P400 [-03 ...]) | AIN function of the device   | Possible settings according to (P400)                |
| (P418 [-01 ...]) | AUT function of the device   | Possible settings according to (P418)                |

IO extension: The module provides a selection of parameters for setting or displaying special operating values. The parameters can be changed with the aid of the NORD CON-software or with a ParameterBox. Communication is only possible via an SK 54xE, SK 2xxE or SK 1x0E which is connected to the module.

| Parameter        | Meaning                  | Comments  |
|------------------|--------------------------|---|
| (P150)           | Set relays               | Set DOOUT directly or control via BUS                                 |
| (P152)           | Factory setting          | Reset the module parameters, calibrate AOOUT                          |
| (P153 [-01 ...]) | Minimum system bus cycle | Reduction of bus load due to the module                               |
| (P160 [-01 ...]) | Set analog output        | Set AOOUT directly or control via BUS                                 |
| (P161 [-01 ...]) | Filter time              | Debounce or round input signals                                       |
| (P162)           | Send broadcast           | Activate Broadcast mode (control of several inverters by this module) |
| (P163 [-01 ...]) | Invert analog output     | Invert analog signal  |
| (P170 [-01 ...]) | Present errors           | Display of module errors  |
| (P171 [-01 ...]) | Software version         | Firmware version / Revision   |
| (P172)           | Configuration            | Module type   |
| (P173)           | Module status            | Status of system bus or connected FI                                  |
| (P174)           | Status of digital inputs | Display of DIN switching status                                       |
| (P175)           | Relay status             | Display of DOOUT switching status                                     |
| (P176 [-01 ...]) | Actual voltage           | Voltage level of analog signals                                       |

### Further documentation and software ([www.nord.com](http://www.nord.com))

| Software                 | Name                                     |
|--------------------------|--|
| <a href="#">NORD CON</a> | Parameterisation and diagnostic software |

| Software | Name |
|----------|------|
|          |      |

| Document                | Name                                       |
|-------------------------|--|
| <a href="#">BU_0000</a> | Description of NORD CON software           |
| <a href="#">BU_0040</a> | ParameterBox manual                        |
| <a href="#">BU_0180</a> | Frequency inverter manual SK 180E, SK 190E |

| Document                     | Name                                 |
|------------------------------|--------------------------------------|
| <a href="#">BU_0200</a>      | Frequency inverter manual SK 2xxE    |
| <a href="#">BU_0505</a>      | Frequency inverter manual SK 54xE    |
| <a href="#">TI_275280000</a> | Bus – connection unit SK TIE4-TU-BUS |

## Description of parameters

| P150                 |  | Set relays                                |   |
|----------------------|--|---|---|
| Setting range        | 0 ... 4  | Other applicable parameter(s) <b>P480</b> |   |
| Factory setting      | { 0 }  |   |   |
| Scope of Application | <b>SK CU4-IOE2, SK TU4-IOE, SK EBIOE-2</b>   |   |   |
| Description          | Sets the switching states of the digital outputs   |   |   |
| Setting values       | Value  | Meaning                                   |   |
|                      | 0  | Via bus                                   | Control of all digital outputs via the system bus; the functions are defined in the frequency inverter ( <b>P480</b> ).   |
|                      | 1  | Outputs OFF                               | All digital outputs are Off (Low = 0 V).  |
|                      | 2  | Output 1 on (DO1):                        | The digital output DO1 is set to "High" (active); digital output DO2 remains switched off.  |
|                      | 3  | Output 2 ON (DO2)                         | The digital output DO2 is set to "High" (active); digital output DO1 remains switched off.  |
|                      | 4  | Outputs 1 and 2 ON                        | All digital outputs are on (High)   |
| P152                 |  | Factory setting                           |   |
| Setting range        | 0 ... 2  |   |   |
| Factory setting      | { 0 }  |   |   |
| Description          | Resets the module parameters to the factory settings.  |   |   |
| Note                 | On completion of this process the parameter display changes back to the value "0"  |   |   |
| Setting values       | Value  | Meaning                                   |   |
|                      | 0  | No change                                 | This function is not implemented.   |
|                      | 1  | Load factory setting                      | All parameters are reset to the factory settings.   |
|                      | 2  | Calibration AOut                          | The accuracy of the analog output can be improved with a correction line, however, this is not activated as standard. If factory settings ( <b>P152</b> ={ 1 }) are loaded, the correction values are retained. A calibration is carried out if ( <b>P152</b> ) is set to { 2 }, i.e. the line is re-recorded and stored in the EEPROM. |
| P153                 |  | Minimum system bus cycle                  |   |
| Setting range        | 5 ... 250 ms   |   |   |
| Arrays               | [-01] = TxSDO Inhibit Time   | [-02] = TxPDO Inhibit time                |   |
| Factory setting      | { [-01] = 10 }   | { [-02] = 5 }                             |   |
| Description          | Adjusts the cycle time for transmission of SDOs (Service Data Objects) and PDOs (Process Data Object) on the system bus. |   |   |
| Note                 | Increasing the cycle time reduces the bus load   |   |   |



| P160                   |   | Set analog output         |                                |
|------------------------|---|---------------------------|--------------------------------|
| <b>Setting range</b>   | -0,1 ... 10,0 V   |                           |                                |
| <b>Arrays</b>          | [-01] = Analog output 1   |                           | [-02] = Analog output 2        |
| <b>Factory setting</b> | { [-01] = -0.1 }  |                           | { [-02] = -0.1 }               |
| <b>Description</b>     | Sets the signal to a defined value, independent of the system bus.  |                           |                                |
| <b>Note</b>            | <p>If the analog output is configured as an output for current values, the factor 2 must be considered.</p> <p>The setting 0 V corresponds in this case to a current value of 0 mA (<math>0 \times 2 = 0</math>).</p> <p>The setting 10 V corresponds in this case to a current value of 20 mA (<math>10 \times 2 = 20</math>).</p> <p>The arrays are only functional if the corresponding IOs are present in the module.</p>   |                           |                                |
| <b>Setting values</b>  | <b>Value</b>  | <b>Meaning</b>            |                                |
|                        | -0.1  | The value is set via Bus  |                                |
|                        | 0.0 ... 10.0  | The value is set manually |                                |
| P161                   |   | Filter time               |                                |
| <b>Setting range</b>   | 0 ... 400 ms  |                           |                                |
| <b>Arrays</b>          | [-01] = Analog input 1  |                           | [-02] = Analog input 2         |
|                        | [-03] = Analog output 1   |                           | [-04] = Digital input 1        |
|                        | [-05] = Digital input 2   |                           | [-06] = Digital input 3        |
|                        | [-07] = Digital input 4   |                           | [-08] = Digital output 1       |
|                        | [-09] = Digital output 2  |                           | [-10] = Analog output 2        |
| <b>Factory setting</b> | { [-01], [-02] = 100 }  | { [-04] ... [-07] = 2 }   | { [-03], [-08] ... [-10] = 0 } |
| <b>Description</b>     | <p>The analog and digital inputs are read cyclically every 250 <math>\mu</math>s, which results in an input uncertainty of 0.25ms. In order to eliminate bounce and smooth the input signals, the information which is read in is passed through a filter routine. The filter time can be parametrised.</p> <p>For example, if a filter time of 1 ms is parametrised for a digital input, the input signal is delayed by approx. 1...1.25ms.</p> <p>The parameterisation of the filter time for the analog outputs is used to round off signal jumps.</p> |                           |                                |
| <b>Note</b>            | The arrays are only functional if the corresponding IOs are present in the module.  |                           |                                |
| P162                   |   | Send broadcast            |                                |
| <b>Setting range</b>   | 0 ... 1   |                           |                                |
| <b>Factory setting</b> | { 0 }   |                           |                                |
| <b>Description</b>     | <p>Activates the broadcast mode.</p> <p>In broadcast mode, up to four frequency inverters can access the module simultaneously.</p>   |                           |                                |
| <b>Note</b>            | <p>In broadcast mode, the addressing of the module (DIP switches) is no longer taken into account.</p>  |                           |                                |
|                        | <p>The received data are linked in the I/O module using OR logic. If several frequency inverters are linked to the digital outputs of the module, the relevant output is set to "High" as soon as it is accessed by a frequency inverter. The analog outputs behave in a similar manner. Here, the highest value has priority.</p>  |                           |                                |
| <b>Setting values</b>  | 0 = Off   |                           | 1 = On (broadcast mode active) |

|                        |  |   |
|------------------------|--|---|
| <b>P163</b>            | <b>AOut Inverse</b>  |   |
| <b>Setting range</b>   | 0 ... 1  |   |
| <b>Arrays</b>          | [-01] = Analog output 1  | [-02] = Analog output 2   |
| <b>Factory setting</b> | { 0 }  |   |
| <b>Description</b>     | Inverts the signal at the analog output.   |   |
| <b>Note</b>            | The arrays are only functional if the corresponding IOs are present in the module. |   |
| <b>Setting values</b>  | 0 = Off  | 1 = On (inversion active)   |
| <b>P170</b>            | <b>Actual error</b>  |   |
| <b>Display range</b>   | 0.0 ... 564.0  |   |
| <b>Arrays</b>          | [-01] = Actual error   | Active error message (not acknowledged)   |
|                        | [-02] = Last fault   | Displays the last error message from the error memory   |
| <b>Description</b>     | Displays an error message.   |   |
| <b>Note</b>            | SK CSX-3... The display is encoded<br>SK PAR-3... The display is in plain text     |   |
| <b>Display values</b>  | 📖 Section "Error messages"   |   |
| <b>P171</b>            | <b>Software version</b>  |   |
| <b>Display range</b>   | 0.0 ... 9999.0   |   |
| <b>Arrays</b>          | [-01] = Software version   | Version number (e.g.: V1.0)   |
|                        | [-02] = Software revision  | Revision number (e.g.: R1)  |
|                        | [-03] = Special version  | Special version of the hardware/software (e.g: 0.0). The value "0" stands for "Standard Version". |
| <b>Description</b>     | Displays the software version (firmware version) of the module                     |   |
| <b>P172</b>            | <b>Configuration</b>   |   |
| <b>Display range</b>   | 0 ... 8  |   |
| <b>Description</b>     | Displays the configuration / version of the device                                 |   |
| <b>Display values</b>  | <b>Value</b>   | <b>Meaning</b>  |
|                        | 0  | CU4 (internal)  |
|                        | 1  | TU4 (external)  |
|                        | 2  | TU1-3 (Techn. Unit)   |
|                        | 3  | TU1-3 (Techn. Unit)+DIP   |
|                        | 4  | EBIOE-2   |
|                        | 5  | TU4 Safe  |
|                        | 6  | TU3 Safe  |
|                        | 7  | CU4IOE-2  |
|                        |  | Module type: SK CU4-...   |
|                        |  | Module type: SK TU4-...   |
|                        |  | Module type: SK TU1- / TU2- / TU3- ...  |
|                        |  | Module type: SK TU1- / TU2- / TU3- ... with DIP-switches  |
|                        |  | Module type: SK EBIOE-2   |
|                        |  | Module type: SK TU4-... / "Safe" version  |
|                        |  | Module type: SK TU3-... / "Safe" version  |
|                        |  | Module type: SK CU4-IOE2-...  |

| P173           |   | Option status          |                                       |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
|----------------|---|------------------------|---------------------------------------|--|----------|---------|---------|---|---|---------------|---|---|----------------------|---|---|--------------|---|---|---------|
| Display range  | 0000 ... FFFF <small>(hex)</small>  |                        |                                       |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
| Description    | Displays the status of the connected devices and the system bus                                 |                        |                                       |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
| Note           | SK CSX-3... The display is in hexadecimal format<br>SK PAR-3... The display is in binary format |                        |                                       |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
| Display values | Value (Bit)   |                        | Meaning                               |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
|                | 0   | ... 5                  | Not used                              |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
|                | 6   | BUS WARNING            | System bus is in status "BUS WARNING" |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
|                | 7   | BUS OFF                | System bus is in status "BUS OFF"     |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
|                | 8   | FI 1 (Low – Bit)       | FI 1 status (low Bit)                 | <table border="1"> <thead> <tr> <th>Bit High</th> <th>Bit Low</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>FI is offline</td> </tr> <tr> <td>0</td> <td>1</td> <td>FI is not recognised</td> </tr> <tr> <td>1</td> <td>0</td> <td>FI is online</td> </tr> <tr> <td>1</td> <td>1</td> <td>FI lost</td> </tr> </tbody> </table> | Bit High | Bit Low | Meaning | 0 | 0 | FI is offline | 0 | 1 | FI is not recognised | 1 | 0 | FI is online | 1 | 1 | FI lost |
|                | Bit High  | Bit Low                | Meaning                               |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
|                | 0   | 0                      | FI is offline                         |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
|                | 0   | 1                      | FI is not recognised                  |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
|                | 1   | 0                      | FI is online                          |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
| 1              | 1   | FI lost                |                                       |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
| 9              | FI 1 (High – Bit)   | FI 1 status (High Bit) |                                       |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
| 10             | ... 11  | FI 2 status            |                                       |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
| 12             | ... 13  | FI 3 status            |                                       |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |
| 14             | ... 15  | FI 4 status            |                                       |  |          |         |         |   |   |               |   |   |                      |   |   |              |   |   |         |

\* FI is switched off

| P174           |   | Status of digital in. |                               |  |
|----------------|---|-----------------------|-------------------------------|--|
| Display range  | 0000 ... 1111 <small>(bin)</small>  |                       |                               |  |
| Description    | Actual image of the switching states of the digital inputs.                                     |                       |                               |  |
| Note           | SK CSX-3... The display is in hexadecimal format<br>SK PAR-3... The display is in binary format |                       |                               |  |
| Display values | Value (Bit)   |                       | Meaning                       |  |
|                | 0   | Digital input 1       | Digital input 1 of the module |  |
|                | 1   | Digital input 2       | Digital input 2 of the module |  |
|                | 2   | Digital input 3       | Digital input 3 of the module |  |
|                | 3   | Digital input 4       | Digital input 4 of the module |  |

| P175           |   | State of relays |                                |  |
|----------------|---|-----------------|--------------------------------|--|
| Display range  | 00 ... 11 <small>(bin)</small>  |                 |                                |  |
| Description    | Actual image of the switching states of the digital outputs.                                    |                 |                                |  |
| Note           | SK CSX-3... The display is in hexadecimal format<br>SK PAR-3... The display is in binary format |                 |                                |  |
| Display values | Value (Bit)   |                 | Meaning                        |  |
|                | 0   | Relay 1         | Digital output 1 of the module |  |
|                | 1   | Relay 2         | Digital output 2 of the module |  |

| P176          |                             | Current voltage |                         |  |
|---------------|-----------------------------|-----------------|-------------------------|--|
| Display range | -10,0 ... 10,0 V            |                 |                         |  |
| Arrays        | [-01] = Analog input 1      |                 | [-02] = Analog input 2  |  |
|               | [-03] = Analog output 1     |                 | [-04] = Analog output 2 |  |
| Description   | Shows the measured voltage. |                 |                         |  |