# SMX 122A/2

*SMXSERIES » Modular » Central expansion » 2 Axes module*

## DESCRIPTION

**Central axis extension module for safe speed and position of up to 2 axis for further evaluation in SMXMODULAR - basic modules**

- 12 Digital inputs
- 2 Analog inputs *
- 4 Encoder interfaces
- Safety controller up to PL e acc. to EN ISO 13849-1 or SIL3 acc. to IEC 61508)

## CHARACTERISTIC OF THE MODULE

» Movement monitoring of one or two axes up to Pl e EN ISO 13849-1 or SIL 3 acc. to IEC 61508
» Speed monitoring
» RPM-monitoring
» Standstill monitoring
» Sense of rotation monitoring
» Safe incremental dimension
» Emergency Stop monitoring
» Position monitoring
» Position range monitoring
» Trend range monitoring
» Target position monitoring
» Parameter management for expansion modules in base device
» Comprehensive diagnostics functions integrated
» with 2 analog inputs *
» Assembly on top hat rail

*\* = see "general data"*

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## SAFETY RELATED CHARACTERISTIC DATA

| | |
|---|---|
| Performance Level | PL e (EN ISO 13849-1) |
| PFH[1] / architecture | 3,0 FIT [2] / Cat 4 |
| | 6,5 FIT [3] / Cat 4 |
| Safety Integrity Level | SIL 3 (IEC 61508) |
| Proof test interval | 20 years = max. operating period |

## GENERAL DATA

| | |
|---|---|
| Max. no. of expansion modules | – |
| Interface for expansion modules | T-bus connector, pluggable in top-hat rail |
| Number of safe digital inputs | 12 |
| Number of safe digital outputs | – |
| Number of safe digital I/O | – |
| Number of relay outputs | – |
| Number of safe analogue inputs | 2 ** |
| Number of auxiliary outputs | – |
| Number of pulse outputs (clock outputs) | – |
| Type of connection | Plug-in terminals with spring or screw connection |
| Axis monitoring | 2 |
| Encoder interfaces (D-Sub / screw terminals) | 2 / 2 * |
| Encoder technology (See table Encoder specifications) | **D-SUB X31 / X32:** <br> SSI-Absolut, SinCos, Incremental-TTL <br><br> **Terminal X23:** <br> HTL-proximity sensor (10kHz) |

\* Maximum 2 Encoder / Axis

\*\* Analog current, voltage inputs are available as options

- » SMX122A-U (/2) Voltage inputs
- » SMX122A-I (/2) Current inputs
- » SMX122A (/2) Voltage inputs (X25) and current inputs (X26)

[1] Value applies only for extension module. For total assessment in accordance with EN ISO 13849-1 one must use a series connection with the corresponding basic device => $PFH_{Logic} = PFH_{Basic} + PFH_{Extension}$

[2] 1-Axis

[3] 2-Axes

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## ELECTRICAL DATA

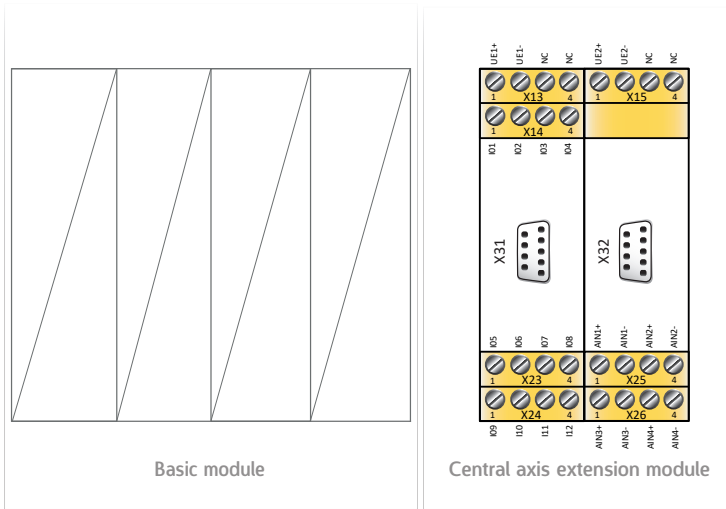| | |
|---|---|
| Supply voltage (tolerance) | – |
| Max. Power consumption (logic) | – |
| Rated data digital inputs | 24 VDC; 20 mA Typ1 acc. to IEC 61131-2 |
| Rated data digital outputs | – |
| Rated data relays | – |
| Rated data analog inputs | -7 ... +10 V |
| | 4 ... 20 mA |

## ENVIRONMENTAL DATA

| | |
|---|---|
| Temperature | 0°C … +50°C operation |
| | -25°C … +70°C storage and transport |
| Class of protection | IP 20 |
| Climatic category | 3K3 acc. to DIN EN 60721-3 |
| Min-, Maximum relative humidity (no condensation) | 5% - 85% |
| EMC | DIN EN 61000-6-2, DIN EN 61000-6-4, DIN EN 61000-6-7, DIN EN 61800-3, DIN EN 61326-3, DIN EN 62061 |
| Operating altitude | 2000m |

## MECHANICAL DATA

| | | |
|---|---|---|
| Dimension (HxDxW [mm]) | | |
| | SMX122A/2 | 100x115x45 |
| Weight [g] | | |
| | SMX122A/2 | 390 |
| Mounting | | to snap on top-hat rail |
| Number of T-Bus | | 2 |
| Min. terminal cross-section / AWG | | 0,2 mm² / 24 |
| Max. terminal cross-section / AWG | | 2,5 mm² / 12 |

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## DEVICE INTERFACES



Basic module

Central axis extension module

| Interface | Description of interface |
|---|---|
| X13 − X15 / X23 − X26 | Voltage supply and I/O interface |
| X31 / X32 | Encoder interfaces |
| X23 | Encoder interfaces |

## VOLTAGE SUPPLY AND I/O INTERFACE

**X13**

| Pin | 1 – UE1+ | Voltage supply Encoder +24V DC X31 |
|---|---|---|
| | 2 – UE1- | Voltage supply Encoder 0V DC X31 |

**X14**

| Pin | 1 - I01 | Safe digital inputs |
|---|---|---|
| | 2 - I02 | |
| | 3 - I03 | |
| | 4 - I04 | |

**X23**

| Pin | 1 - I05 | Safe digital inputs |
|---|---|---|
| | 2 - I06 | |
| | 3 - I07 | |
| | 4 - I08 | |

**X24**

| Pin | 1 - I09 | Safe digital inputs |
|---|---|---|
| | 2 - I10 | |
| | 3 - I11 | |
| | 4 - I12 | |

**X15**

| Pin | 1 - UE2+ | Voltage supply Encoder +24V DC X32 |
|---|---|---|
| | 2 -UE2- | Voltage supply Encoder 0V DC X32 |
| | 3 - NC | No function |
| | 4 - NC | |

**X25 (voltage inputs)**

| Pin | 1 - AIN 1+ | Safe analogue input |
|---|---|---|
| | 2 - AIN 1- | |
| | 3 - AIN 2+ | Safe analogue input |
| | 4 - AIN 2- | |

**X26 (current inputs)**

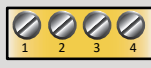| Pin | 1 - AIN 3+ | Safe analogue input |
|---|---|---|
| | 2 - AIN 3- | |
| | 3 - AIN 4+ | Safe analogue input |
| | 4 - AIN 4- | |

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## ENCODER INTERFACES

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### Pin assignment X31 / X32

| Pin | X31 / X32<br>Inc / Sin/Cos / SSI-Absolut | Front side<br>SMX |
|-----|------------------------------------------|-------------------|
| 1 | n.c. | |
| 2 | GND_ENC | |
| 3 | n.c. | |
| 4 | B- / COS - / Clk - | |
| 5 | A + / SIN + / Data + | |
| 6 | A- / SIN - / Data - | |
| 7 | n.c. | |
| 8 | B+ / COS + / Clk + | |
| 9 | U_ENC | |

### Pin assignment X23

| Pin | Z1 − Z1 / Z2 − Z2 | Terminal |
|-----|-------------------|----------|
| 1 | $A\,(\bar{A})\,/\,A\,(\bar{A})$ | X23 |
| 2 | $--\,/\,B\,(\bar{B})$ | |
| 3 | $A\,(\bar{A})\,/\,A\,(\bar{A})$ | |
| 4 | $--\,/\,B\,(\bar{B})$ | |

## ENCODER SPECIFICATIONS

### Incremental - TTL

| | |
|---|---|
| Physical Layer | RS-422 compatible |
| Measuring signal A/B | Track with 90° degree phase difference |
| Type of connection | D-SUB 9pole |
| Max. frequency of input cycles (X31, X32) | 200 kHz |

### Sin/Cos

| | |
|---|---|
| Physical Layer | RS-422 compatible |
| Measuring signal A/B | Track with 90° degree phase difference |
| Type of connection | D-SUB 9pole |
| **Standard Mode** | |
| Max. frequency of input clock pulses (X31, X32) | 200 kHz |

### SSI-Absolut

| | |
|---|---|
| Data interface | **S**erial **S**ynchronous **I**nterface (**SSI**) with variable data length of 12 – 28 Bit |
| Data format | Binary, Gray code |
| Physical Layer | RS-422 compatible |
| Type of connection | D-SUB 9pole |
| **Mode** | **Master or Listener** |
| **SSI-Master operation** | |
| Clock rate | 150 kHz |
| **SSI-Listener operation** | |
| Clock rate (X31, X32) | 100 kHz ... 200 kHz |
| Min. clock pause time | 150 µsec |
| Max. clock pause time | 1 msec |

### HTL proximity sensor

| | |
|---|---|
| Signal level | 24V / 0V |
| Max. counting pulse frequency (circuit logic de-bounced) | 10 kHz |
| Pulse width | 50 µsec |
| Type of connection (X23) | Plug-in terminals with spring or screw connection |

### HTL proximity switch - extended monitoring

| | |
|---|---|
| Signal level | 24V / 0V |
| Max. counting frequency (circuit logic de-bounced) | 4 kHz |
| Physical Layer | PUSH / PULL |
| Measuring signal A/B | Track with 90° degree phase difference |
| Type of connection (X23) | Plug-in terminals with spring or screw connection |

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## ORDER INFORMATIONS

### EXTENSIONS

| item | description | item no. |
|---|---|---|
| SMX122A/2 | Axis extension module for up to 2 axes + analogue option (voltage + current) | 2169 |
| SMX122A-I/2 | Axis extension module for up to 2 axes + analogue option (current) | 2170 |
| SMX122A-U/2 | Axis extension module for up to 2 axes + analogue option (voltage) | 2311 |

### ACCESSORIES

| item | description | item no. |
|---|---|---|
| SX*xxxx-x* | Terminal connector, screw terminals (set), encoded for cabling SMX122A/2 | on request |
| SX*xxxx-x* | Terminal connector, spring terminals (set), encoded for cabling SMX122A/2 | on request |
| SX0000-9 | T-Bus connector voltage-carrying (grey) | 1015 |

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