Switching Amplifier
MC13-41B
4 channels

The module's parameterisation mode is determined by the master. Either the switching amplifier is parameterised using the front switches, or via the master station using the requisite software.

Each input circuit is monitored by a dual colour LED for signal/error indications:
- yellow: input circuit activated
- off: input circuit de-activated
- red: wire-break or short-circuit

The dual colour „Status“ LED indicates the module status:
- green: supply voltage is present, the module is operating
- green flashing: initialisation of link to the master; constant green flashing: connection cannot be established
- red flashing: wrongly inserted module
- off: hardware error, the module is not operating.

Functions and input circuit monitoring for wire-break and short-circuit conditions can be set for each channel. An error in the input circuits is transferred to the process control system via the diagnosis byte. The module requires 1 byte of the master's memory.

Power "on"/bus error
Switching status/channel error
Switching status/channel error

Status

1
2
3
4

Input circuits galvanically isolated from each other, from the power supply and from the bus

Function programming also via switches on front panel

Input circuit monitoring for short-circuit and wire-break (can be disabled separately for each channel)

Dual colour LED for signal/fault display of each channel

The module is a 4-channel switching amplifier with intrinsically safe input circuits. These circuits are galvanically isolated from each other and from the power supply and can be connected to NAMUR sensors (EN 50227) or mechanical contacts.
sensoplex® MC

Function programming:

10 switches on the front panel allow programming of the device.

- Position N/K (NAMUR or mechanical contacts as input devices): Position K - input circuit monitoring of the respective channel is de-activated; position N - input circuit monitoring of the channel is activated.

- Position A/R (N.O. or N.C. mode): The mode indicated refers to a mechanical contact. When using a sensor according to EN 50227 (NAMUR) as the input device, the signal direction is inverse to mechanical contacts.

The top eight switches program the functions of each channel.

- Switch position K „off“: Short-circuit monitoring off
- Switch position D „off“: Wire-break monitoring off

If the software programming mode has been selected, wire-break and short-circuit monitoring functions cannot be selected separately.
This switching amplifier can be programmed only via the front switches. Software programming is not possible.

Functions and input circuit monitoring for wire-break and short-circuit conditions can be set separately for channel block 1...4 and channel block 5...8.

An error in the input circuits is transferred to the process control system via the diagnosis byte.

Each input circuit is monitored by a dual colour LED for signal/error indications:
- yellow: input circuit activated
- off: input circuit de-activated
- red: wire-break or short-circuit

The dual colour "Status" LED indicates the module status:
- green: supply voltage is present, the module is operating
- green flashing: initialisation of link to the master; constant green flashing: connection cannot be established
- red flashing: wrongly inserted module
- off: hardware error, the module is not operating.

The MC13-8B is an 8-channel switching amplifier with intrinsically safe input circuits. The input circuits are connected to each other via a common potential. The device provides galvanic isolation from the power supply and can be connected to NAMUR sensors (EN 50227) or mechanical contacts.
**Fieldbus Components**

**sensoplex® MC**

### Function programming

Six switches on the front of the module allow programming of the device.

The top four switches program the following functions of channel block 1...4 and 5...8.

- Position N/K (NAMUR or mechanical contacts as input devices): Position K - input circuit monitoring of the respective channel block is de-activated; position N - input circuit monitoring of the channel block is activated. If line monitoring is activated and mechanical contacts are used, a resistor must be connected to these contacts.

- Position A/R (N.O. or N.C. mode): The mode indicated refers to a mechanical contact. When using a sensor according to EN 50227 (NAMUR) as the input device, the signal direction is inverse to mechanical contacts.

The last two switches on the bottom are for common enabling or disabling of short-circuit and/or wire-break monitoring for all channels with activated input circuit monitoring (switch position N).

- Switch position K „off“: Short-circuit monitoring off
- Switch position D „off“: wire-break monitoring off

The module requires 1 byte of the master’s memory.

<table>
<thead>
<tr>
<th>Channel</th>
<th>1...2.2 kΩ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senseplex® MC rack assembly</td>
<td></td>
</tr>
<tr>
<td>10...22 kΩ</td>
<td></td>
</tr>
</tbody>
</table>

### Ex-Approvals accord. to Certificate of Conformity

| TÜV 96 ATEX 1135 X |
| Two groups of 4 | One group of 8 |

| Maximum values |
| No-load voltage U₀ | 8 V |
| Short-circuit current Ic | 8 mA |
| Switching threshold | 1.55 mA |
| Hysteresis | 0.2 mA |
| Wire-break threshold | ≤ 0.15 mA |
| Short-circuit current | ≥ 6 mA |

### LED indications

- Power „on“/bus error: green/red (dual-colour LED)
- Switching status/error indication: yellow/red (8 dual-colour LEDs)

### Eurocard module

Base material: Epoxy resin, glass fibre reinforced, quality class FR4

Connection: sensoplex® MC rack assembly

Operating temperature: 0...50 °C

Coding (No. 802)

```
100 x 160 mm (DIN 41494)
Epoxy resin, glass fibre reinforced, quality class FR4
plastic, 4TE = 20.32 mm, for individual interlocking
sensoplex® MC rack assembly
0...50 °C
```
The MC13-81B is an 8-channel switching amplifier with intrinsically safe input circuits. The input circuits are connected to each other via a common potential. The device provides galvanic isolation from the power supply and may be connected to NAMUR sensors (EN 50227) or mechanical contacts. Due to the common potential it is required to observe the application note on intrinsic safety. The input function mode can be programmed via the parameter byte. Input circuit monitoring for wire-break and short-circuit cannot be disabled. An error in the input circuit is transferred to the control system via the diagnosis telegram.

Each input circuit is monitored by a dual colour LED for signal/error indications:
- yellow: input circuit activated
- off: input circuit de-activated
- red: wire-break or short-circuit

The dual colour „Status“ LED indicates the module status:
- green: supply voltage is present, the module is operating
- green flashing: initialisation of link to the master; constant green flashing: connection cannot be established
- red flashing: wrongly inserted module
- off: hardware error, the module is not operating.

This module requires 1 byte of the master’s memory.

- Intrinsically safe input circuits [EEx ia] IIC
- Input circuits galvanically isolated from the power supply and from the bus
- Function programming of each channel via software
- Input circuit monitoring for short-circuit and wire-break
- Dual colour LED for signal/fault display of each channel
Function programming
This amplifier is programmed via the parameter byte by the host system or the master station.

Software parameterisation
If parameters are set via software, the parameter byte is assembled as follows:

```
Bit  7 6 5 4 3 2 1 0
Fct. W 8 W 7 W 6 W 5 W 4 W 3 W 2 W 1
```

Bit 0 represents the function mode of channel 1 (W1), bit 1 represents channel 2 (W2) and so forth.

\( W_n = 0 \): normally open mode (N.O.)
\( W_n = 1 \): normally closed mode (N.C.)

Data transfer in the Dual Port Ram
The input data of this plug-in module are stored separately for each channel in the master's dual port ram.

```
Bit  7 6 5 4 3 2 1 0
Ch.  8 7 6 5 4 3 2 1
```

Depending on the selected function mode, the two bit states can have different meanings.

0 normally closed mode:
- contact closed or inductive
- NAMUR sensor not attenuated
- normally open mode:
- contact open or inductive
- NAMUR sensor attenuated

1 normally closed mode:
- contact open or inductive
- NAMUR sensor not attenuated
- normally open mode:
- contact closed or inductive
- NAMUR sensor not attenuated

Software parameterisation
If parameters are set via software, the parameter byte is assembled as follows:

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Ch.  8 7 6 5 4 3 2 1
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- NAMUR sensor not attenuated
- normally open mode:
- contact closed or inductive
- NAMUR sensor not attenuated

Ex-Approvals acc. to Certificate of Conformity

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<tr>
<th>Maximum values</th>
<th>TÜV 96 ATEX 1135 X</th>
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<tbody>
<tr>
<td>9.6 V</td>
<td>two groups of 4</td>
</tr>
<tr>
<td>9.6 V</td>
<td>one group of 8</td>
</tr>
<tr>
<td>39.2 mA</td>
<td>78.4 mA</td>
</tr>
<tr>
<td>94.1 mW</td>
<td>188.2 mW</td>
</tr>
</tbody>
</table>

External inductances/capacitances
- [EEx ia] IIC
  - 20 mH/3.6 µF
  - 5 mH/3.6 µF
- [EEx ia] IIB
  - 80 mH/26 µF
  - 20 mH/26 µF

LED indications
- Power “on”/bus error
  - green/red (dual-colour LED)
- Switching status/error
  - yellow/red (8 dual-colour LEDs)

Eurocard module
Base material
- 100 x 160 mm (DIN 41494)
- Epoxy resin, glass fibre reinforced, quality class FR4

Front panel
- plastic, 4TE = 20.32 mm, for individual interlocking
- sensoplex® MC rack assembly

Connection
- 0...50 °C

Coding (No. 802)

```
<table>
<thead>
<tr>
<th>d</th>
<th>b</th>
<th>z</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```