The MC13-451Ex0-RP is a four-channel device with intrinsically safe input circuits. Each channel has one pnp output transistor with thermally activated short-circuit protection.

The input circuits can be monitored for wire-break and short-circuit condition. If no faults are in any input circuit and the power is on, the common alarm output is enabled (transistor conducting, relay closed). Depending on the input signal, the two-colour LED for the affected channel is yellow and the green “Power” LED is on.

If a short or a wire-break occurs in either input circuit, the common alarm output is disabled (transistor not conducting, relay open) and the two-colour LED of the affected channel changes to red.

If a 32-pole edge connector is used, the relay outputs can be programmed to function either in direct (N.O.) mode or inverse (N.C.) mode. (Programming via jumper blocks on the card.)
Programming via front DIP-switches

The functions are programmed via ten DIP-switches located in the front of the device:

```
<table>
<thead>
<tr>
<th>Channel</th>
<th>Mode</th>
<th>Channel</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>N/K</td>
<td></td>
<td>N/K</td>
<td></td>
</tr>
<tr>
<td>R/A</td>
<td></td>
<td>R/A</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>N/K</td>
<td></td>
<td>R/A</td>
<td></td>
</tr>
<tr>
<td>K off</td>
<td>D off</td>
<td>K off</td>
<td>D off</td>
</tr>
</tbody>
</table>
```

Each channel has a programming jumper block to select the following functions:

- **DIP-switch position N/K:**
  (NAMUR or mechanical contacts as input devices):
  Position K: input circuit monitoring off
  Position N: input circuit monitoring on.

- **DIP-switch position A/R:**
  (N.O. or N.C. mode)
  The mode indicated refers to a mechanical contact. Because the signal mode of inductive sensors according to DIN 19234 is inverse to mechanical contacts, this switch is used to select the type of input device used by reversing the signal direction of the input circuit.

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

- Switch position K "OFF": short-circuit monitoring off
- Switch position D "OFF": wire-break monitoring off

### Type
- **Type:** MC13-451Ex0-RP/24VDC
- **Ident-No.:** 90 282 01

### Supply Voltage $U_0$
- **Supply Voltage** $U_0$: 20.4...27.6 VDC
- **Ripple $W_{pp}$:** ≤ 10 %
- **Overtoltage release:** 33 V ± 1.5 V
- **Reverse polarity protection:** ≤ 250 V
- **Power/Current consumption:** ≤ 130 mA
- **Galvanic isolation:** between input circuit, output circuit and supply voltage for 250 V$_{ms}$, test voltage 2.5 kV$_{ms}$

### Input Circuits
- **DIN 19234 (NAMUR), intrinsically safe**
- **Operating characteristics**
  - No-load voltage $U_0$: 8 V
  - Short-circuit current $I_k$: 1.55 mA
  - Hysteresis: 0.2 mA
  - Wire-break threshold: ≤ 0.1 mA
  - Short-circuit threshold: ≥ 6 mA

### Output Circuits
- **four relay outputs (SPDT contacts)**
- **Relay outputs**
  - Switching voltage: ≤ 30 V
  - Switching current: ≤ 1 A
  - Switching capacity: ≤ 30 VA/30 W
  - Switching frequency: ≤ 10 Hz
  - Contact material: silver-alloy + 3 µm Au
  - Transistor output
    - PNP, short-circuit protected
  - Switching output: ≤ 30 VDC
  - Switching current: ≤ 50 mA
  - Switching frequency: ≤ 10 Hz
  - Common alarm output
    - Relay output
    - Transistor output

### Ex-Approval acc. to Certification of Conformity
- **PTB No. Ex-84/2110X**

### Maximum nominal values
- **No-load voltage $U_0$: 9.6 V**
- **Short-circuit current $I_k$: 42.3 mA**
- **Maximum external inductances/capacitances**
  - $[EEx ia]$ IIC 1 mH/720 nF (alternatively: 5 mH/560 nF)
  - $[EEx ib]$ IIC 19 mH/4 µF

### LED Indications
- **Power "ON": green**
- **Status indication / fault:** yellow/red (4 two-colour LEDs)

### Eurocard
- **Material:** glass-fiber reinforced epoxy resin, quality class FR4
- **Front panel:** plastic, 4TE = 20.32 mm, individually interlocking connector per DIN 41612, type F, 32-pole (series z+d) or 48-pole
- **Operating temperature:** -25...+60 °C
- **Coding No. 20**

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**Switching Amplifiers**

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