To provide fast response times for applications with relatively low speed (up to 1 kHz), the device operates on a digital pulse principle. High speed monitoring is based on a time window.

Both relay outputs have independently adjustable ON and OFF switching points. The switching hysteresis is based upon the adjusted preset. Setpoint 1 is programmed for underspeed detection. If the speed is below setpoint 1, relay 1 is de-energised. Setpoint 2 is programmed for overspeed detection. If the speed exceeds setpoint 2, relay 2 is de-energised.

A yellow LED indicates the switching status of the respective output relay.

A start-up time delay 0…1000 s can be adjusted during which the output relay is energised. This function serves for inhibiting underspeed indications during system start up. The start-up time delay is triggered by a potential-free NO contact, which is suited for switching intrinsically safe circuits, or by applying supply voltage (terminals 7/8 linked).

The NAMUR input is monitored for wire-break and short-circuit conditions. When an input circuit error occurs, both relays de-energise and the yellow LED (pulse indication) changes to red.
Rotational Speed Monitors

Depending on the kind of application, two scaling factors can be selected, i.e., adjustable multipliers of the input signal. The time based factor enables computation in units other than Hz. The second factor is used when there are more than one target per rotation. All adjustments and the display operate with the actual frequency calculating both factors.

**Example:** Suppose, the display should be in min⁻¹ instead of Hz and the number of pulses per revolution increased by an additional target. In this case, the factor adjustment would be as follows:

factor 1 (time based) = 60
factor 2 (number of targets) = 2.

Menu assisted card parameter programming is accomplished via two push buttons on the front cover. The following parameters can be preselected for display:

- Setpoint relay 1, switching points (on and off)
- Setpoint relay 2, switching points (on and off)
- Input circuit monitoring: off, wire-break and/or short-circuit
- Start-up time delay
- Zero speed detection
- Scaling factor 1 + 2

The value of the selected parameter is displayed.

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### Rotational Speed Monitoring

- **Measuring range:** 0.06...600 000 min⁻¹ (digitally adjustable)
- **Input frequency:** ≤ 1 200 000 min⁻¹ (20 kHz)
- **Pause duration:** ≥ 0.02 ms
- **Pulse duration:** ≥ 0.02 ms
- **Start-up time delay:** 0...1000 s (adjustable)

### Input Circuits

- **20 NAMUR input**
- **Operating characteristics:**
  - Operating voltage: \( U_0 = 8.2 \text{ V} \)
  - Switching threshold: \( i_k = 8.2 \text{ mA} \)
  - Switching hysteresis: \( 0.2 \text{ mA} \)
  - Wire-break trip point: ≤ 0.1 mA
  - Short-circuit trip point: ≥ 6 mA

### Ex Approvals acc. to Certificate of Conformity

- PTB 97 ATEX 2240

### Galvanic Isolation

- Between input circuit, output circuit and supply voltage for 250 V rms, test voltage 2.5 kV rms

### Output Circuits

- **2 relay outputs**
- **Relay output**
  - Switching voltage: ≤ 250 V
  - Switching current: ≤ 2 A
  - Switching capacity: ≤ 500 VA/60 W
  - Contact material: silver-alloy + 3 µm Au

### LED Indications

- **Status indication:** 2 x yellow
- **Input pulse (2-colour LED):**
  - Switched: yellow
  - Fault: red
- **Display:** LCD-display (4-digit)

### Housing

- 16-pole, 36 mm wide, Polycarbonate/ABS
- Flammability class V-0 per UL 94
- Panel mounting or snap-on clamps for top-hat rail (DIN 50022)
- Screw terminals with self-lifting pressure plates
- ≤ 2 x 2.5 mm² or 2 x 1.5 mm²
- IP20
- -25...+60 °C

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**multimodul Rotational Speed Monitor MK21-12Ex0-R**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ident-No.</th>
<th>Operating voltage</th>
<th>Line frequency</th>
<th>Ripple ( W_{pp} )</th>
<th>Current consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK21-12Ex0-R/230VAC</td>
<td>75 430 00</td>
<td>184 ... 264 VAC</td>
<td>48...62 Hz</td>
<td>-</td>
<td>≤ 5 VA</td>
</tr>
<tr>
<td>MK21-12Ex0-R/24VDC</td>
<td>75 430 07</td>
<td>19.2 ... 28.8 VDC</td>
<td>-</td>
<td>≤ 10 %</td>
<td>≤ 5 W</td>
</tr>
</tbody>
</table>