Rotational Speed Monitor MK21-12-R

- Overspeed and underspeed detection
- For use with sensors according to EN 50227 (NAMUR)
- Detection range 1 mHz...10 kHz (0.06...600 000 pulses/min⁻¹)
- Overrange protected up to 20 kHz (1 200 000 min⁻¹)
- Easy parameter setting:
  - Two setpoint relays, each with switch-on and switch-off point
  - Two range factors for signal adjustment:
    - time based: 0...1000
    - number of input pulses per revolution: 0...10 000
  - Start-up time delay
  - Zero speed detection
- Galvanic isolation between input circuit, output circuit and supply voltage
- 2 relay outputs, each with one SPDT contact

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 switch points. The switching hysteresis is based upon the adjusted preset limit value. Setpoint 1 is programmed for underspeed detection. If the speed is below setpoint 1, relay 1 de-energises. Setpoint 2 is programmed for overspeed detection. If the speed exceeds setpoint 2, relay 2 de-energises. A yellow LED indicates the switching status of the respective output relay.

For underspeed monitoring (setpoint 1) a built-in start-up time delay variable from 0...1000 s can be set. During the start-up time delay, the output relay is energised. The start-up time delay inhibits an under-range alarm indication during system start-up. The start-up time delay is triggered by an external contact (NO) or when power is applied to the speed monitor (terminals 7/8 jumpered).

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.

The MK21-12-R is a rotational speed monitor designed to monitor pulse sequences from rotating shafts on motors, gears, turbines etc., and is suitable for use with sensors according to EN 50227 (NAMUR). A display located on the front cover indicates the actual speed.
Rotational Speed Monitors

Depending on the 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 calculated from both factors.

Example: Suppose, the display should be in min⁻¹ instead of Hz and the number of pulses per revolution is 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 parameter programming is accomplished via two push buttons on the front cover.

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

The value of the selected parameter is displayed.

### Rotational Speed Monitoring

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>0.06...600 000 min⁻¹ (digitally adjustable)</td>
</tr>
<tr>
<td>- Input frequency</td>
<td>≤ 1 200 000 min⁻¹ (20 kHz)</td>
</tr>
<tr>
<td>Pause duration</td>
<td>≥ 0.02 ms</td>
</tr>
<tr>
<td>Pulse duration</td>
<td>≥ 0.02 ms</td>
</tr>
<tr>
<td>Start-up time delay</td>
<td>0...1000 s (adjustable)</td>
</tr>
</tbody>
</table>

### Input Circuits

- NAMUR input: according to EN 50227, terminals 5/6
  - Operating characteristics: $U_0 = 8.2 \text{ V}, \ i_0 = 8.2 \text{ mA}$
  - Switching threshold: 1.55 mA
  - Switching hysteresis: 0.2 mA
  - Wire-break trip point: ≤ 0.1 mA
  - Short-circuit trip point: ≥ 6 mA

### Galvanic Isolation

between input circuit, output circuit and supply voltage for 250 Vrms, test voltage 2.5 kVrms

### 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

- Power "ON": green
- Status indication: 2 x yellow
- Input pulses (2-colour-LED): yellow – fault: red
- Display: LCD-display (4-digit)

### Housing

16-pole, 36 mm wide, Polycarbonate/ABS flammability class V-0 per UL 94

### Mounting

panel mounting or snap-on clamps for top-hat rail (DIN 50022)

### Connection

screw terminals with self-lifting pressure plates ≤ 2 x 2.5 mm² or 2 x 1.5 mm² with wire sleeves

### Degree of protection

IEC 60529/EN 60529
IP20

### Operating temperature

-25...+60 °C

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Ident-No.</th>
<th>Operating voltage</th>
<th>Line frequency</th>
<th>Ripple Wpp</th>
<th>Current consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK21-12-R/230VAC</td>
<td>75 430 20</td>
<td>184 ... 264 VAC</td>
<td>48...62 Hz</td>
<td>-</td>
<td>≤ 5 VA</td>
</tr>
<tr>
<td>MK21-12-R/24VDC</td>
<td>75 430 27</td>
<td>19.2 ... 28.8 VDC</td>
<td>-</td>
<td>≤ 10 %</td>
<td>≤ 5 W</td>
</tr>
</tbody>
</table>