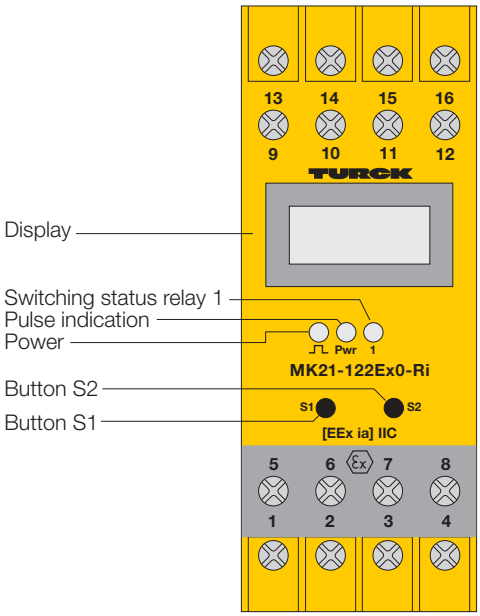


Rotational Speed Monitor with Frequency-Current Converter MK21-122Ex0-Ri 1-channel

- **1-channel rotational speed monitor with frequency-current converter**
- **Overspeed and underspeed detection plus window function**
- **Intrinsically safe input circuit EEx ia**
- **Area of application according to ATEX: II (1) GD**
- **For use with intrinsically sensors according to EN 60947-5-6 (NAMUR)**
- **Line monitoring of NAMUR sensors**
- **Detection range 1 mHz...10 kHz (0.06...600 000 pulses/min[1])**
- **Simple menu-guided parameterisation**
- **Full galvanic isolation**
- **Relay output with one SPDT contact**
- **Analogue current output: 0...20 mA / 4...20 mA**
- **Universal supply voltage (20...250 VAC/20...125 VDC)**

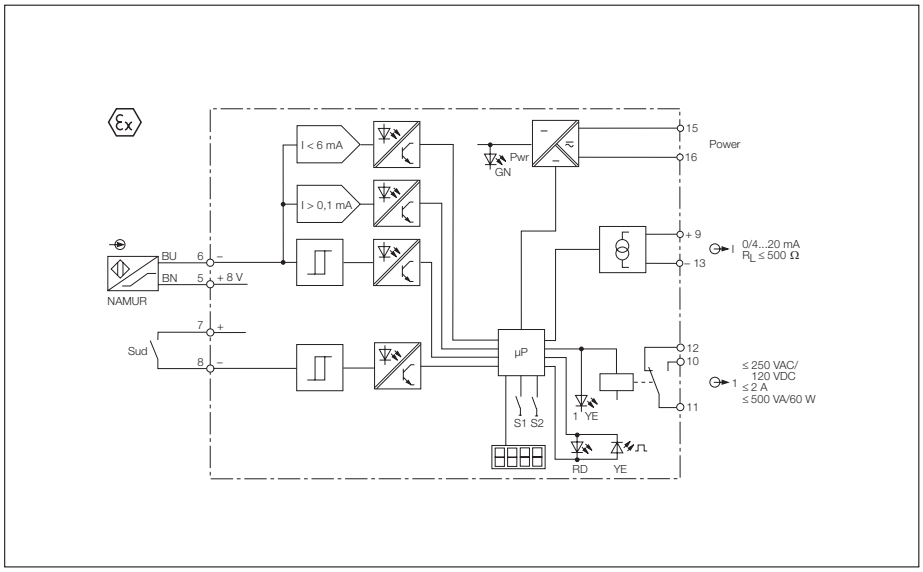
The MK21-122Ex0-Ri is a rotational speed monitor designed to monitor pulse sequences from rotating shafts on motors, gears, turbines etc., for overspeed and underspeed conditions relative to pre-adjusted limit values. The analogue output provides a current signal proportional to the rotational speed for further processing. A display located on the front cover indicates the actual speed.

Intrinsically safe sensors per EN 60947-5-6 (NAMUR) may be used for signal detection. The input circuit features intrinsic safety. Line monitoring for short-circuit and/or wire-break conditions can be adjusted. If there is an error in the input circuit, the relay de-energises, the analogue outputs changes to either 0 mA or 24 mA (depending on setting) and the yellow pulse LED changes to red.

To provide fast response times for applications with relatively low speed, the device operates on a digital pulse principle. High speed monitoring is based on a time window. In low-speed applications, the response time depends fully on the pulse period.

Device parameterisation is accomplished with two push buttons. The settings are indicated via the display.

The relay output can be programmed either for overspeed or underspeed detection or a window function as a combination of both. The switching hysteresis is defined by the adjustable switch ON and switch OFF points.



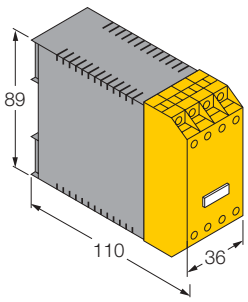
Rotational Speed Monitor MK21-122Ex0-Ri

The relay operates in the normally open mode; i.e. the relay is energised if the speed is within the acceptable range. The relay may also be used as an alarm output. The relay will then de-energise if there is an input circuit error or a power failure.

In the underspeed monitoring mode, it is possible to adjust a start-up time delay (AU-time) during which the output relay is constantly energised. Consequently underspeed indications are inhibited during system start-up. The start-up time delay is activated by linking intrinsically safe terminals 7 and 8 or by applying power to the device after the terminals have been linked.

The upper und lower range value can be freely adjusted. Within the measuring range (selectable ranges 0...20 mA or 4...20 mA), the frequency is converted linearly into a current value. A damping time, during which the current output follows a change of frequency with a defined delay, is adjustable.

The actual speed and the limit value settings are displayed in Hz. By adjusting a time basis and programming the number of pulses per rotation, it is possible to adjust all settings and the display to the required measuring unit. Suppose, the display should be in min^{-1} instead of Hz, the time-based factor adjustment would be 60.



Type	MK21-122Ex0-Ri
Ident-no.	7543053
Supply voltage U_B	20...250 VAC / 20...125 VDC
Line frequency (AC)	40...70 Hz
Power consumption	≤ 2.5 W
Galvanic isolation	between input circuit, output circuit and supply voltage for 250 V_{rms}, test voltage 2.5 kV_{rms}
Rotational speed monitoring	underspeed/overspeed
Monitoring range/adjustable range	0.06...600 000 min^{-1} (digitally adjustable)
Input frequency	≤ 1 200 000 min^{-1} (20 kHz)
Pulse duration	≥ 0.02 ms
Pulse pause	≥ 0.02 ms
Start-up time delay	0…1000 s (adjustable)
Input circuits	
NAMUR input	to EN 60947-5-6, (NAMUR)
– Operating values	U_0 = 8.2 V; I_k = 8.2 mA
– Switching threshold	1.55 mA
– Switching hysteresis	0.2 mA
– Wire-break threshold	≤ 0.1 mA
– Short-circuit threshold	≥ 6 mA
Ex approval acc. to certificate of conformity	PTB 97 ATEX 2240
Max. values	
– No-load voltage U_0	13 V
– Short-circuit current I_0	30 mA
– Safety voltage U_m	250 VAC/125 VDC
Max. external inductances/capacitances L_0/C_0	
– [EEx ia] IIC	40 mH/1 µF
– [EEx ia] IIB	150 mH/6.2 µF
Marking of the device	II (1) GD [EEx ia] IIC
Output circuits	
Relay output	1 SPDT contact
– Switching voltage	≤ 250 V
– Switching current	≤ 2 A
– Switching capacity	≤ 500 VA/60 W
– Switching frequency	≤ 5 Hz
– Contact material	Ag-alloy + 3 µm Au
Analogue output	
– Current source	0/4...20 mA
– Load	≤ 500 W
LED indications	
Power	green
Switching status	2 x yellow
Pulse indication (dual colour LED)	yellow – error: red
Display	LCD-Display (four digits)
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
Connection profile	≤ 2 x 2.5 mm^2 or 2 x 1.5 mm^2 with wire sleeves
Protection degree (IEC 60529/EN 60529)	IP20
Temperature range	-25…+60 °C