Rotational Speed Monitor
MC 25-121Ex0-RP/24VDC

The MC25-121Ex0-RP is a rotational speed monitor that evaluates pulse strings from rotating motors parts, gears or turbines for speed indication. A display in the front of the device indicates the actual speed.

This unit can accommodate the following input devices:

- one intrinsically safe NAMUR input with monitoring for wire-break and short-circuit condition (II), or
- one non intrinsically safe 24 VDC input without input monitoring function (I).

The type of input device is selected at the time of programming.

Two relay outputs and two npn short-circuit protected transistor outputs are available for setpoint indication.

Additional control devices can be operated via a short-circuit protected pulse output (d6). This terminal is also used as the input for npn 3-wire sensors if NAMUR devices are not used.

- Intrinsically safe input circuit [EEEx ia] IIC with static wire-break and short-circuit monitoring
- For use with either NAMUR sensors or 24 VDC input
- Operating range 10 mHz...2 kHz (0.6...120 000 min⁻¹)
- Setpoints 1 and 2 freely selectable
- Adjustable attenuation factor
- Adjustable display scaling 0.001...2000
- One relay and one transistor output each for setpoint 1 and 2
- Hysteresis adjustable for both setpoint outputs (1...30 %)
- Pulse output
- Internal interface for parameter programming via PC
Rotational Speed and Motion Controls

The setpoints can be programmed independently from each other. They are also designed that they can be used for either "overrange" or "underrange" monitoring. This dual preset allows setpoint monitoring in one signal flow direction providing, for instance, alarm indication and shutoff. When one preset has been reached, the respective setpoint output de-activates (relay contacts open, transistor not conducting).

The intrinsically safe NAMUR input circuit is monitored for wire-break and short-circuit conditions. The alarm outputs will de-activate during a malfunction (relay contacts open, transistor not conducting), an "err" (Error) message will flash on the four digit display and the green "Power" LED changes to red.

This unit operates on the digital pulse principle which provides very short response times. To generate the output signal it measures the time between two consecutive input pulses. The next pulse updates the output signal.

The output signal is updated whenever the last measured digital pulse is exceeded or when pulses are suddenly missing. This means if no pulses are received, the output signal continuously drops to 0/4 mA relative to the overrange time of the last measured digital pulse.

To steady the input signal, an attenuation constant can be set between 1 and 30. When the constant is set to 1 (1 pulse), no signal attenuation takes place. The attenuation principle is based upon the floating average from the adjusted number of pulses.

In addition to the signal attenuation, an extra range factor (scaling factor) can be set to adjust to the input signal. The range factor is a multiplier for the input signal adjustable from 0.01...2000 (0.001...2000 via PC).

By means of this scaling factor, the display and the indication of the analogue output can be indicated in measuring units other than Hz. The display shows the actual frequency, multiplied by the factor.

An example of an application that would benefit from this feature is the detection of the conveyor speed. By monitoring the shaft key on drives or conveyors, it is possible to get a display as well as an analogue output directly in m/s (conveyor speed). Here it is only necessary to determine the transmission ratio of the motor to the conveyor.

Should only min⁻¹ be displayed instead of Hz, then the factor must be set to 60. Additional targets put on the motor can also be factored in (for instance display in min⁻¹ with two targets = 60/2 = factor 30).

Card parameter programming is accomplished either with two toggle switches in the front, or with personal computer (PC). The following parameters can be pre-selected to display:

- setpoint 1
- setpoint 2
- NAMUR input/pnp input
- range factor
- hysteresis of setpoint outputs
- start-up delay
- setpoint function
  (underrange/overrange)
- attenuation constant

The selected parameter is indicated by a front LED. The value of the parameter will be displayed on the four digit display.

Start-up Time Delay

During drive system start-up (zero speed) an underspeed control would inhibit the system from starting. Therefore, underspeed controls incorporate an adjustable time delay to allow for start-up time. During the start-up time delay the output relays will be energised.

The start-up time delay is triggered by applying 24 VDC to z6, or when power for the speed monitor is applied.
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<td>Ident-No.</td>
<td>90 545 10</td>
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### Supply Voltage $U_B$
- 20.4...27.6 VDC
- Ripple $W_{pp}$: $\leq 10\%$
- <200 mA
- Galvanic isolation between input circuit, output circuit and supply voltage for 250 V$_{rms}$, test voltage 2.5 kV$_{rms}$

### Input Circuit
- alternatively: NAMUR input/24 VDC input
- NAMUR input (zd32) intrinsically safe per EN 50014/20 for NAMUR sensors
- 24 VDC input (d6) for 3-wire sensors, mechanical contacts
- Overrange protection: NAMUR input: up to 3 kHz; 24 VDC input: up to 4 kHz

### Output circuits
- Setpoint outputs: one transistor and one relay output each
  - Transistor output: pnp; short-circuit protected ($I_L \leq 50\ mA$)
  - Relay output: 1 dry SPDT contact
- Switching voltage: $\leq 250\ \text{VAC/DC}$
- Switching current: $\leq 2\ A$
- Switching capacity: $500\ \text{VA/60 W}$
- Contact material: silver-alloy + 3 µm Au
- Additional pulse output: transistor output: pnp, short-circuit protected ($I_L \leq 50\ mA$)

### Ex-Approval acc. to Certification of Conformity
- Input circuit: PTB No. Ex-86.B.2077X
  - Maximum nominal values
    - No-load voltage $U_0$: 10.5 V
    - Short-circuit current $I_k$: 13.7 mA
  - Maximum external inductances/capacitances: $[EEx\ ia]_\text{IIC}$ 5 mH/550 nF

### Interface
- RS232 serial/V.24 via adapter MC-IM-232

### Operating Range
- 10 mHz...2.0 kHz (0.6...120 000 min$^{-1}$)

### LED Indications
- Power "ON" (2-colour LED): green: device operating - red: fault
- Limit values (2-colour LED): green: programming mode - yellow: at preset value
- Programming mode for card parameters: green
- Pulse indication: yellow
- Display factor ("x 10", "÷ 10"): red
- Display: red (4 digits)

### Eurocard
- Material: glass-fiber reinforced epoxy resin, quality class FR4
- Front panel: plastic, 4TE = 20.32 mm
- Connection: individually interlocking
- Operating temperature: -25...+60 °C
- Coding No. 15