The MC25-11Ex0-RI rotational speed monitor is used to convert pulse strings (i.e. from rotating motor parts, gears or turbines) into standard current signals (0/4…20 mA) for speed indication.

A display on the front of the device indicates the actual speed even if in excess of the preset range.

The device 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.

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

The intrinsically safe NAMUR input circuit is monitored for wire-break and short-circuit conditions. The alarm output will deactivate 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.

The parameters for the current monitoring functions during a wire-break or a short are programmable. When a fault in the input circuit occurs, the current output is either 0 mA or ≥ 22 mA.

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 (preprogrammed) 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 preselected to display:

- upper limit
- lower limit
- current output 0...20 mA/4...20 mA
- NAMUR input/pnp input
- analogue output function during fault condition: 0 mA/≥ 22 mA
- attenuation constant
- range factor

The selected parameter is indicated by front LEDs. The value of the parameter will be displayed on the four digit display.
**Type**  | MC25-11Ex0-R/24VDC  
**Ident-No.**  | 90 545 20  

**Supply Voltage** $U_a$  
Ripple $W_{pp}$  
Power/Current consumption  
Galvanic isolation  

- 20.4...27.6 VDC  
- $\leq 10 \%$  
- $< 200 \text{ mA}$  
- 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  
- Overrange protection NAMUR input: up to 3 kHz; 24 VDC input: up to 4 kHz

**Output Circuits**  
Current output  
Alarm output  
- Transistor output  
- Relay output  
  - Switching voltage  
  - Switching current  
  - Switching capacity  
  - Contact material  
  - Additional pulse output  
  - Interface

- $0/4...20 \text{ mA (load $\leq 600 \Omega$)}$  
- one transistor and relay output each  
- pnp, short-circuit protected ($I_k \leq 50 \text{ mA}$)  
- 1 dry SPDT contact  
- $\leq 250 \text{ VAC/DC}$  
- $\leq 2 \text{ A}$  
- $\leq 500 \text{ VA/60 W}$  
- silver-alloy + 3 µm Au  
- transistor output: pnp, short-circuit protected ($I_k \leq 50 \text{ mA}$)  
- RS232 serial/RS-24 via adapter MC-IM-232

**Ex-Approval acc. to certification of Conformity**  
- PTB No. Ex-B.86.B.2077X

**Input Circuit**  
- Maximum nominal values  
  - No-load voltage $U_0$  
  - Short-circuit current $I_k$  
  - Maximal external inductances/capacitances

- 10.5 V  
- 13.7 mA  
- [EEx ia] IIC 5 mH/550 nF

**Transfer Characteristics**  
Effective range  
Linearity tolerance  
Load impedance  
Input voltage impedance  
Ambient temperature sensitivity

- 10 mHz...2.0 kHz (0.6...120 000 min$^{-1}$) upper and lower limit adjustable  
- $\leq 0.1 \%$ of final value (typically 0.03 %)  
- $\leq 0.01 \%$ of final value  
- negligible  
- $\leq 0.005 \%$ / K of final value

**LED Indications**  
- Power "ON" (2-colour LED)  
  - green: device operating  
  - red: fault

- Limit values  
  - Programming mode for card parameters  
  - Pulse indication  
  - Display factor ("x 10", "÷ 10")

- green  
- green  
- yellow  
- red

- Display

**Eurocard**  
Material  
Front panel  
Connection  
Operating temperature  
Coding No. 15

- glass-fiber reinforced epoxy resin, quality class FR4  
- plastic, 4TE = 20.32 mm individually interlocking  
- connector per DIN 41612, type F, 32-pole (series z+d)  
- -25...+60 °C  
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