In addition to the relay output, the rotational speed meters MS22-Ri...feature an analogue output of 0/4 to 20 mA. 3-wire pnp sensors, sensors according to EN 50227 or signals between 10 and 30 VDC may be connected.

If connected to NAMUR sensors, the input control circuit is monitored for both wire-break and short-circuit conditions. When a fault occurs, the dual colour LED, indicating operational readiness, changes from green to red and the output relay de-energises independently of the programmed monitoring mode.

The yellow input LED enables distinction between wire-break and short-circuit (wire-break: LED off). In case of an error, the output current will go to 0. Thus fault conditions can be detected in subsequent processing or display devices.

If 3-wire sensors are used, wire-break detection applies only to the supply line. Wire-break or short-circuit on the output line of the sensor are not detected.

If external sources are connected, terminals 11 and 9 should be used. Suppression of fault signals can be accomplished with a 1...10 kΩ resistor between terminals 10 and 11.

Leaving terminals 12/13 open activates the underspeed monitoring mode: when the limit value is underranged, the relay de-energises. Linking terminals 12/13 selects the overspeed monitoring mode; when the limit value is exceeded the relay de-energises.
Rotational Speed Monitors

The device operates on the digital pulse method which shortens reaction times in applications where pulses occur infrequently. Additionally a standard analogue output signal, which is proportional to the measured rotational speed, is provided for control and monitoring purposes. By linking terminals 13/14, the analogue signal can be changed from 0...20 mA to 4...20 mA.

The upper end value of the measuring range is adjusted digitally using three rotary switches on the device front and assigned to an analogue output value of 20 mA. Below 0.6 min⁻¹ the output current adopts the value 0.4 mA. Within the selected measuring range, the switch point is adjustable as a percentage between 10 and 100 % of the upper end value by means of an additional rotary switch. The output relay status is indicated by a yellow LED.

In the underspeed monitoring mode, a fixed start-up time delay (AU-time) of 15 s is provided. The output relay is energised during the start-up time delay. Consequently underspeed indications are inhibited during system start-up. The time delay is activated by a potential-free contact between terminals 15/16 when the device is on, or by linking terminals 15/16 and then applying power to the device.

Rotational Speed Monitoring
- Measuring range 0.01...1660 Hz or 0.6...100 000 min⁻¹
- Switch point adjustment range 10...100 %
- Input frequency ≤ 150 000 min⁻¹
- Pause duration ≥ 0.2 ms
- Pulse duration ≥ 0.2 ms
- Hysteresis approx. 10 %
- Start-up time delay 0.5...30 s (adjustable, 10 positions)
- Temperature drift frequency ≤ 0.005 %/K
- Temperature drift analogue output ≤ 0.005 %/K
- Linearity error ≤ 0.1 % v.E.

Clearences and Creepage Distances
- Input and output circuit to power supply ≥ 4 mm
- Input circuit to power supply ≥ 4 mm (at 230 VAC)
- Test voltage ≥ 2 kV (at 24 VDC: 500 V)

Input Circuits
- NAMUR input according to EN 50227, terminals 9/10
- Operating characteristics U₀ = 8.2 V; I₀ = 8.2 mA
- Switching thresholds 1.4 mA ≤ I ≤ 1.8 mA
- Wire-break trip point ≤ 0.15 mA
- Short-circuit trip point ≥ 6 mA
- Operating characteristics U ≤ 15 V; I ≤ 30 mA
- "OFF" signal 0...5 VDC
- "ON" signal 10...30 VDC

Output Circuits
- 1 relay output and 1 analogue output
- Relay output 1 SPDT contact
- Switching voltage ≤ 250 V
- Switching current ≤ 2 A
- Switching capacity ≤ 500 VA/60 W
- Contact material AgCdO + 3 µ Au
- Analogue output 0/4...20 mA (load ≤ 600 Ω)

LED Indications
- Power “ON” (2-colour LED) green – fault: red
- Status indication yellow
- Input pulses yellow

Housing
- 50 mm wide, Polycarbonate/ABS
- Mounting panel mounting or snap-on clamps for top-hat rail (DIN 50022)
- Connection 2 x 8 self-lifting pressure plates ≤ 2 x 2.5 mm² or 2 x 1.5 mm² with wire sleeves
- Connection profile
- Degree of protection (IEC 60529/EN 60529) IP20
- Operating temperature -25...+60 °C

multisafe® Rotational Speed Monitor MS22-Ri

<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>MS22-Ri/230VAC</td>
<td>05 080 00</td>
<td>18...264 VAC</td>
<td>48...62 Hz</td>
<td>-</td>
<td>4.5 VA</td>
</tr>
<tr>
<td>MS22-Ri/24VDC</td>
<td>05 080 07</td>
<td>18...30 VDC</td>
<td>-</td>
<td>≤ 10 %</td>
<td>2.5 W</td>
</tr>
</tbody>
</table>