### Vert-X 31E - 24V / 4 - 20mA

**Applications**
- Concrete pump
- Access control system
- Forklift

**Features general**
- High protection class IP68
- Compact dimensions
- Non-contacting measuring method
- Very long life
- High accuracy of measurement
- Applications under adverse ambient conditions possible (humidity, dampness, dust, vibrations etc.)
- Full resolution and accuracy at programmed electrical angle
- Detection of magnetic loss (with safety flag)

**Features MH-C**
- Resolution of 12bit
- Lower price than MH-C2

**Features MH-C2**
- Resolution of 14bit
- Index point(s), sense of rotation and angle settable resp. programmable by customer (optional)

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**Sensor principle**

<table>
<thead>
<tr>
<th>MH-C</th>
<th>MH-C2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical data</strong></td>
<td></td>
</tr>
<tr>
<td>Measuring range</td>
<td>°</td>
</tr>
<tr>
<td>Indep. linearity (typ.)</td>
<td>% of meas. range</td>
</tr>
<tr>
<td>Max. hysteresis</td>
<td>°</td>
</tr>
<tr>
<td>Resolution</td>
<td>bit</td>
</tr>
<tr>
<td>Max. repeatability</td>
<td>°</td>
</tr>
<tr>
<td>Sample rate fast mode</td>
<td>kHz</td>
</tr>
<tr>
<td>Sample rate slow mode</td>
<td>kHz</td>
</tr>
<tr>
<td>System propagation delay fast mode</td>
<td>μs</td>
</tr>
<tr>
<td>System propagation delay slow mode</td>
<td>μs</td>
</tr>
<tr>
<td>Max. temperature coefficient of the output signal</td>
<td>ppm/K</td>
</tr>
<tr>
<td>MTTFd / MTBF</td>
<td>years</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>VDC</td>
</tr>
<tr>
<td>Current consumption without load (typ.) fast mode</td>
<td>mA</td>
</tr>
<tr>
<td>Current consumption without load (typ.) slow mode</td>
<td>mA</td>
</tr>
<tr>
<td>Ohmic load at output</td>
<td>kOhm</td>
</tr>
<tr>
<td>Max. capacitive load at output</td>
<td>nF</td>
</tr>
<tr>
<td>Reverse polarity protection of power supply</td>
<td>yes</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Cable 3pole</td>
</tr>
<tr>
<td>Cross section of single wires</td>
<td>mm²</td>
</tr>
<tr>
<td>Redundancy feasible</td>
<td>no</td>
</tr>
<tr>
<td>Electrical connection redundant</td>
<td>-</td>
</tr>
<tr>
<td>Cross section of single wires redundant</td>
<td>mm²</td>
</tr>
</tbody>
</table>

**Mechanical data**

| | MH-C | MH-C2 |
| Mechanical range | ° | 360 (continuous) | 360 (continuous) |
| Protection class | IP68 | IP68 |
| Min. life | movements | no limitation | no limitation |
| Operating & storage temperature | °C | -40 ... +85 | -40 ... +85 |
| EN 60068-2-6 Vibration (Am = 0.75mm, f = 5...2000Hz) | g | 50 | 50 |
| EN 60068-2-27 Shock | g | 200 | 200 |

**Standards**

- EN 55022 class B, Emission radiated (30...230MHz) dBμV/m max. 30 max. 30
- EN 55022 class B, Emission radiated (230...1000MHz) dBμV/m max. 37 max. 37
- EN 55022 class B, Emission conducted (0.15...0.5MHz) dBμV max. 56 ... 46 max. 56 ... 46
- EN 55022 class B, Emission conducted (0.5...5MHz) dBμV max. 46 max. 46
- EN 55022 class B, Emission conducted (5...30MHz) dBμV max. 50 max. 50
- EN 61000-4-2, ESD (contact discharge / air discharge) kV ±4 / ±8 ±4 / ±8
- EN 61000-4-3, Immision HF radiated (80...1000MHz/1.4...2.7GHz) V/m 30 30
- EN 61000-4-4, Burst (on all lines) kV ±1 ±1
- EN 61000-4-5, Surge (lines to ground) kV ±1 ±1
- EN 61000-4-6, Immision HF conducted (0.15...80MHz) Vemk 10 10
- EN 61000-4-8, Immision magnetic field (50Hz) A/m 300 300
- EN 60393-1 Insulation resistance (500VDC, 1bar, 2s) GOhm 20 20
- EN 60393-1 Dielectric strength (VAC, 50Hz, 1min, 1bar) kV 1 1

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Errors and omissions excepted. Subject to change without notice. / State: 04.10.16

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sales@contelec.ch
## Vert-X 31E - 24V / 4 - 20mA

### Ordering code

Please define number (max. 127), position and width of the pulses.

### Output characteristics

<table>
<thead>
<tr>
<th>Feature</th>
<th>MH-C</th>
<th>MH-C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive gradient CW</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Positive gradient CCW</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Positive gradient with 1 switch output*</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Positive gradient CCW with 1 switch output*</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Positive gradient with 2 switch outputs*</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Positive gradient CCW with 2 switch outputs*</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Sense of rotation settable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>Zero point &amp; sense of rotation settable</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Middle point &amp; sense of rotation settable</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>Start + end point &amp; sense of rotation settable</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Programmable with Vert-X EasyAdapt</td>
<td>P</td>
<td></td>
</tr>
</tbody>
</table>

### Electrical connection

<table>
<thead>
<tr>
<th>Feature</th>
<th>MH-C</th>
<th>MH-C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
<td>4mA ... 20mA</td>
<td>5mA ... 20mA</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>24VDC</td>
<td>Standard 1</td>
</tr>
</tbody>
</table>

### Electrical angle

- Standard Electrical angle 360°
- Optional 03 to 35°; Declaration in 10° steps
- Optional Special angle

### Sensor principle

- Standard MH-C
- Optional MH-C2

### Mounting hole

- Standard Through-hole ø 4.4mm
- Optional Through-hole ø 4.4mm with counterbore ø 7.4mm

### Mechanical version

- Standard 31E5 - Magnetic actuator type 5
- Standard 31E6 - Magnetic actuator type 6
- Standard 31E7 - Magnetic actuator type 7
- Optional 31E8 - Magnetic actuator type 8
- Optional 31E9 - Special magnetic actuator

### Options (on request)

- Custom magnetic actuator X X
- Custom cable X X
- Sample rate in fast mode X X
- Switch functions TTL (max. 2) X X
- Special characteristic curve X X
- Special electrical angle within 30° to 360° (ex factory) X X
- Electrical angle programmable (Software) X X
- Start & end point settable (Additional wires) X X
- Sense of rotation CW/CCW settable / programmable (Additional wires or Software) X X
- Index point settable / programmable (Additional wires or Software) X X
- Extended operating range, axial (without safety flag) X X

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A company of the Siedle-Group
Vert-X 31E5

Accessories (incl.)
- None

Operating range/Air gap (A)
- Standard with safety flag
  - Single: 0 ... 6.2mm
- Extended without safety flag (Optional)
  - Single: 0 ... 10.0mm

Features Safety Flag
- Detection of magnetic loss
- System shut-down in case of magnetic actuator out of valid operating range
- Recommended for safety relevant applications

Vert-X 31E5axxx 15x xxx 1)  
Vert-X 31E5bxxx 15x xxx 2)
Vert-X 31E6

Accessories (incl.)
- None

Operating range/Air gap (A)
- Standard with safety flag
  - Single: 0 ... 5.0mm
- Extended without safety flag (Optional)
  - Single: 0 ... 8.4mm

Features Safety Flag
- Detection of magnetic loss
- System shut-down in case of magnetic actuator out of valid operating range
- Recommended for safety relevant applications

Vert-X 31E6axxx 15x xxx ¹)
Vert-X 31E6bxxx 15x xxx ²)

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Vert-X 31E7

Accessories (incl.)
- None

Operating range/Air gap (A)
Standard with safety flag
- Single: 0 ... 13.3mm

Extended without safety flag (Optional)
- Single: 0 ... 19.7mm

Features Safety Flag
- Detection of magnetic loss
- System shut-down in case of magnetic actuator out of valid operating range
- Recommended for safety relevant applications

Vert-X 31E7axxx 15x xxx 1)
Vert-X 31E7bxxx 15x xxx 2)

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A company of the Siedle-Group
Vert-X 31E8

Accessories (incl.)
• None

Operating range/Air gap (A)
Standard with safety flag
Single 0 ... 12.8mm

Extended without safety flag (Optional)
Single 0 ... 18.7mm

Features Safety Flag
• Detection of magnetic loss
• System shut-down in case of magnetic actuator out of valid operating range
• Recommended for safety relevant applications

Vert-X 31E8axxx 15x xxx 1)
Vert-X 31E8bxxx 15x xxx 2)
Vert-X 31E

Indep. linearity with radial misalignment (@360°)

<table>
<thead>
<tr>
<th>Radial misalignment [mm]</th>
<th>Independent linearity [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>0.7</td>
<td>1.5</td>
</tr>
<tr>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>1.5</td>
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<tr>
<td>5.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

- Magnetic actuator type 5
- Magnetic actuator type 6
- Magnetic actuator type 7
- Magnetic actuator type 8