### Sensor principle

#### MH-C
- **Electrical data**
  - Measuring range: ° 0 ... 360
  - Independ. linearity (without misalignment): ±0.3%
  - Independ. linearity (with allowed misalignment @ 360°): ±0.5%
  - Max. hysteresis: ° 0.1
  - Resolution: bit 14
  - Max. repeatability: ° 0.1
  - System propagation delay fast mode: kHz 2.2
  - System propagation delay slow mode: kHz (0.55)
  - System propagation delay fast mode: µs 400
  - System propagation delay slow mode: µs (600)
  - Max. temperature coefficient of the output signal: ppm/°K 25
  - MTTFd / MTBF: years 668/668
  - Power supply voltage: VDC 5 (±10%)
  - Current consumption without load (typ.) fast mode: mA 14
  - Current consumption without load (typ.) slow mode: mA (9)
  - Min. ohmic load at output: kOhm -
  - Max. capacitive load at output: nF -
  - Reverse polarity protection of power supply: yes
  - Electrical connection axial: Wires (3x)
  - Cross section of single wires: mm² 0.25 (AWG24)
  - Electrical connection radial: Cable 3pole
  - Cross section of single wires: mm² 0.25 (AWG24)
  - Redundancy feasible: no

#### MH-C2

#### Mechanical data
- Mechanical range: ° 360 (continuous)
- Protection class: IP68
- Min. life: movements no limitation
- Operating & storage temperature (with ribbon cable): °C -40 ... +105
- Operating & storage temperature (with round cable): °C -40 ... +85
- IEC 68-2-6 Vibration (Amx = 0.75mm, f = 5 ... 2000 Hz): g 50
- IEC 68-2-27 Shock: g 200

#### Standards
- EN 55022 classe B, Emission radiated (30... 230 MHz): dB(μV/m) max. 30
- EN 55022 classe B, Emission radiated (230...1000MHz): dB(μV/m) max. 37
- EN 61000-4-2, ESD (contact discharge / air discharge): kV ±4 / ±8
- EN 61000-4-3, Immision HF radiated (80... 1000 MHz): V/m 100
- EN 61000-4-4, Burst (on all lines): kV ±1
- EN 61000-4-5, Surge (lines to ground): kV ±1
- EN 61000-4-6, Immision HF conducted (0.15...80MHz): V/mk 10
- EN 61000-4-8, Immision magnetic field (50Hz): A/m 300
- IEC 60393-1 Insulation resistance (500VDC, 1bar, 2s): GOhm 20
- IEC 60393-1 Dielectric strength (VAC, 50Hz, 1min, 1bar): kV 1

### Vert-X 13E - 5V / SPI

#### Applications
- Servodrives
- Inserting machines
- Sewer inspection robots
- Medical applications

#### Features
- High protection class IP68
- Very compact dimensions
- Non-contacting measuring method
- Very long life
- High accuracy of measurement
- Use in cramped installation conditions
- Full resolution and accuracy at programmed electrical angle
### Vert-X 13E - 5V / SPI

#### Ordering code

**Vert-X**  
13  
E  
3

#### Electrical connection / axial

<table>
<thead>
<tr>
<th>Options</th>
<th>MH-C</th>
<th>MH-C2</th>
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</thead>
<tbody>
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<td>Standard</td>
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<tr>
<td>Ribbon cable</td>
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<td>Optional</td>
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<td>Special cable</td>
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#### Electrical connection / radial

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<th>Options</th>
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<td>Round cable</td>
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#### Output characteristics

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<tr>
<th>Output signal</th>
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<table>
<thead>
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<th>Power supply voltage</th>
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<td>5VDC</td>
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#### Electrical angle

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<td>36° Standard</td>
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#### Length of ribbon cable

<table>
<thead>
<tr>
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#### Length of cable

<table>
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<tr>
<th>Length</th>
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<tr>
<td>Special length</td>
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</tbody>
</table>

#### Options (on request)

- Custom magnetic actuator
- Custom modification of the housing
- Custom cable / wires
- Sample rate in slow mode
- Switch functions TTL (max. 2)
- Special characteristic curve
- Special electrical angle within 30° to 360° (ex factory)
- Electrical angle programmable (Software)
- Start & end point settable (Additional wires)
- Sense of rotation CW/CCW settable / programmable (Additional wires or Software)
- Index point settable / programmable (Additional wires or Software)

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**MH-C**  
- X

**MH-C2**  
- -

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Errors and omissions excepted. Subject to change without notice. State: 15.01.14

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Vert-X 13E3 xxx xxx 1xx

Accessoires (incl.)
• 1x Fixation clip
• 2x Slotted cylinder head screw M3x8

Working position (Z) and max. permitted misalignment of the magnetic actuator
see mounting information

Vert-X 13E3 xxx xxx 6xx

Accessoires (incl.)
• 1x Fixation clip
• 2x Slotted cylinder head screw M3x8

Working position (Z) and max. permitted misalignment of the magnetic actuator
see mounting information
Vert-X 13E
Mounting information

Working position (Z)
MH-C 11.05mm
MH-C redundant 10.55mm

Max. permitted misalignment of the magnetic actuator

\[
\begin{align*}
dx &\pm 0.25\text{mm} \\
dy &\pm 0.25\text{mm} \\
dz &\pm 0.50\text{mm}
\end{align*}
\]

Vert-X 13E
Accessoires
Fixation clip