



## Vert-X 22 - 5V / 10...90% Ub

### Applications

- Wind vanes
- Valve control
- Steering angle sensor for F1-racing cars

### Features general

- Robust design, sealed stainless steel housing
- Contactless measuring method
- 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

### Features MH-C

- Linearity of  $\pm 0.3\%$
- Resolution of 12bit
- Full redundancy possible
- Lower price than MH-C2

### Features MH-C2

- Linearity of  $\pm 0.1\%$
- Resolution of 14bit
- Index point(s), sense of rotation and angle settable resp. programmable by customer (optional)

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Contelec AG  
 Portstrasse 38  
 CH-2503 Biel/Bienne  
 Phone +41 (0)32 3665600  
 Telefax +41 (0)32 3665604  
 sales@contelec.ch

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Sensor principle		MH-C	MH-C2
<b>Electrical data</b>			
Measuring range	°	0 ... 360	0 ... 360
Indep. linearity	% of meas. range	$\pm 0.3$	$\pm 0.1$
Max. hysteresis	°	0.1	0.1
Resolution	bit	12	14
Max. repeatability	°	0.1	0.1
Sample rate fast mode	kHz	(5)	(2)
Sample rate slow mode	kHz	1.66	0.5
System propagation delay fast mode	$\mu$ s	(800)	(800)
System propagation delay slow mode	$\mu$ s	4600	2500
Max. temperature coefficient of the output signal	ppm/°K	50	50
MTTFd / MTBF	years	668 / 668	308 / 308
Power supply voltage	VDC	5 ( $\pm 10\%$ )	5 ( $\pm 10\%$ )
Current consumption without load (typ.) fast mode	mA	(14)	(15)
Current consumption without load (typ.) slow mode	mA	9	10
Min. ohmic load at output	kOhm	10	10
Max. capacitive load at output	nF	100	100
Reserve polarity protection of power supply		yes	no
Electrical connection (s = shielded)		Cable 3pole, s	Cable 3pole, s
Cross section of single wires	mm <sup>2</sup>	0.25 (AWG24)	0.25 (AWG24)
Redundancy feasible		yes	no
Electrical connection redundant (s = shielded)		Cable 6pole, s	-
Cross section of single wires redundant	mm <sup>2</sup>	0.25 (AWG24)	-
<b>Mechanical data</b>			
Mechanical range	°	360 (continuous)	360 (continuous)
Protection class		IP54 / IP67	IP54 / IP67
Max. starting torque at specified protection class	Ncm	0.5 / 3	0.5 / 3
Max. rotating speed	rpm	6000	6000
Min. life	movements	360 Mio.	360 Mio.
Max. permitted axial shaft load	N	100	100
Max. permitted radial shaft load	N	50	50
Operating & storage temperature	°C	-40 ... +125	-40 ... +85
IEC 68-2-6 Vibration (Amax = 0.75mm, f = 5 ... 2000 Hz)	g	20	20
IEC 68-2-27 Shock	g	50	50
<b>Standards</b>			
EN 55022 class B, Emission radiated (30... 230 MHz)	dB( $\mu$ V/m)	max. 30	max. 30
EN 55022 class B, Emission radiated (230...1000MHz)	dB( $\mu$ V/m)	max. 37	max. 37
EN 61000-4-2, ESD (contact discharge / air discharge)	kV	$\pm 4 / \pm 8$	$\pm 4 / \pm 8$
EN 61000-4-3, Immission HF radiated (80... 1000 MHz)	V/m	30	30
EN 61000-4-4, Burst (on all lines)	kV	$\pm 1$	$\pm 1$
EN 61000-4-5, Surge (lines to ground)	kV	$\pm 1$	$\pm 1$
EN 61000-4-6, Immission HF conducted (0.15...80MHz)	Vemk	10	10
EN 61000-4-8, Immission magnetic field (50Hz)	A/m	30	30
IEC 60393-1 Insulation resistance (500VDC, 1bar, 2s)	GOhm	20	20
IEC 60393-1 Dielectric strength (VAC, 50Hz, 1min, 1bar)	kV	1	1



**Vert-X 22 - 5V / 10...90% Ub**  
**Ordering code**

**\* Switch outputs**  
 Please define number (max. 127), position and width of the pulses.

Output characteristics	
Positive gradient CW	Standard 1
Positive gradient CCW	Optional 2
Redundant, positive gradient CW	Optional 3
Redundant, positive gradient CCW	Optional 4
Redundant, crossed signal curves	Optional 5
Positive gradient CW with 1 switch output*	Optional A
Positive gradient CCW with 1 switch output*	Optional B
Positive gradient CW with 2 switch outputs*	Optional C
Positive gradient CCW with 2 switch outputs*	Optional D
Sense of rotation settable	Optional E
Zero point & sense of rotation settable	Optional F
Middle point & sense of rotation settable	Optional G
Start + end point & sense of rotation settable	Optional H
Programmable with Vert-X EasyAdapt	Optional P

Output signal	
10% ... 90% Ub	Standard 2
x% ... y% Ub (within 5 ... 95%)	Optional 3

Power supply voltage	
5VDC	Standard 2

Electrical connection	
4	Standard Round cable 3pole
6	Optional Round cable 6pole
9	Optional Special cable

Length of cable	
02	Standard 1.0m
06	Optional 3.0m
10	Optional 5.0m
99	Optional Special cable

**Vert-X** 2 2 0 1 7 3 6 2 2 1 4 0 2

Electrical angle	
36	Standard Electrical angle 360°
xx	Optional 03 to 35; Declaration in 10° steps
99	Optional Special angle

Sensor principle	
7	MH-C
8	MH-C2

Mechanical version		
2201	Standard	Bushing M10x0,75 ; 6 mm shaft D-shape ; IP54
2202	Standard	Bushing M10x0,75 ; 3,175 mm shaft slotted ; IP54
2211	Standard	Servo mount size 9 ; 6 mm shaft D-shape ; IP54
2212	Standard	Servo mount size 9 ; 3,175 mm shaft slotted ; IP54
2231	Standard	Bushing M10x0,75 ; 6 mm shaft D-shape ; IP67
2232	Standard	Bushing M10x0,75 ; 3,175 mm shaft slotted ; IP67
2241	Standard	Servo mount size 9 ; 6 mm shaft D-shape ; IP67
2242	Standard	Servo mount size 9 ; 3,175 mm shaft slotted ; IP67
2299	Optional	Special housing ; Special shaft

	MH-C	MH-C2
Custom shaft design	X	X
Custom modification of the housing	X	X
Custom cable	X	X
Interface x% ... y% Ub (within 5% ... 95% Ub)	X	X
Sample rate in fast mode	X	X
Switch functions TTL (max. 2)	X	X
Special characteristic curve	-	X
Special electrical angle within 30° to 360° (ex factory)	X	X
Electrical angle programmable (Software)	-	X
Start & end point settable (Additional wires)	-	X
Sense of rotation CW/CCW settable / programmable (Additional wires or Software)	-	X
Index point settable / programmable (Additional wires or Software)	-	X

**Options (on request)**

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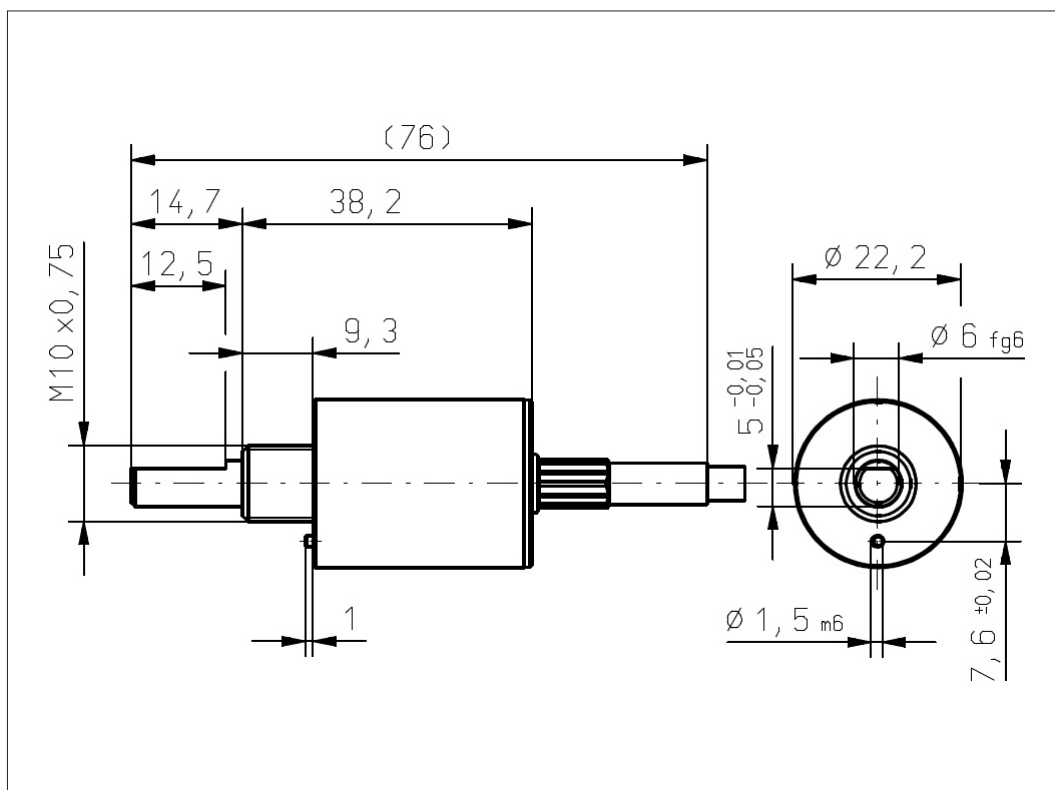
Contelec AG  
 Portstrasse 38  
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**Vert-X 2201 / Vert-X 2231**

**Accessoires (incl.)**

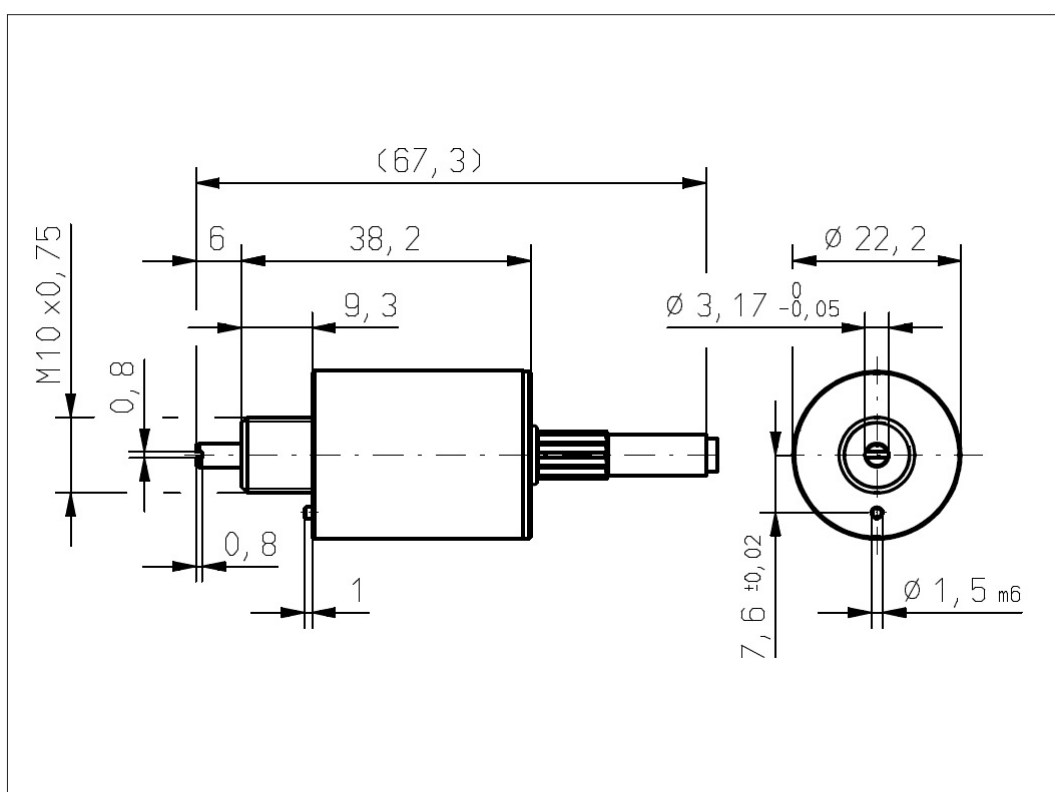
- 1x Nut M10x0.75 / SW13
- 1x Serrated lock washer



**Vert-X 2202 / Vert-X 2232**

**Accessoires (incl.)**

- 1x Nut M10x0.75 / SW13
- 1x Serrated lock washer



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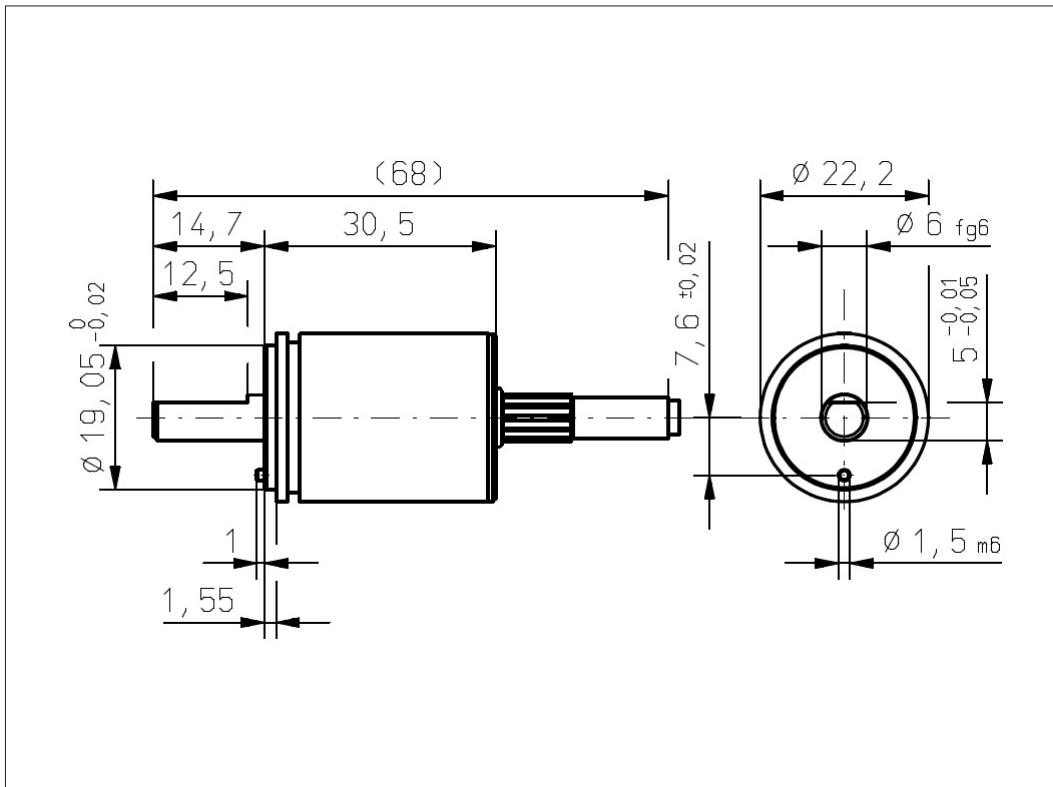
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### Vert-X 2211 / Vert-X 2241

#### Accessoires (incl.)

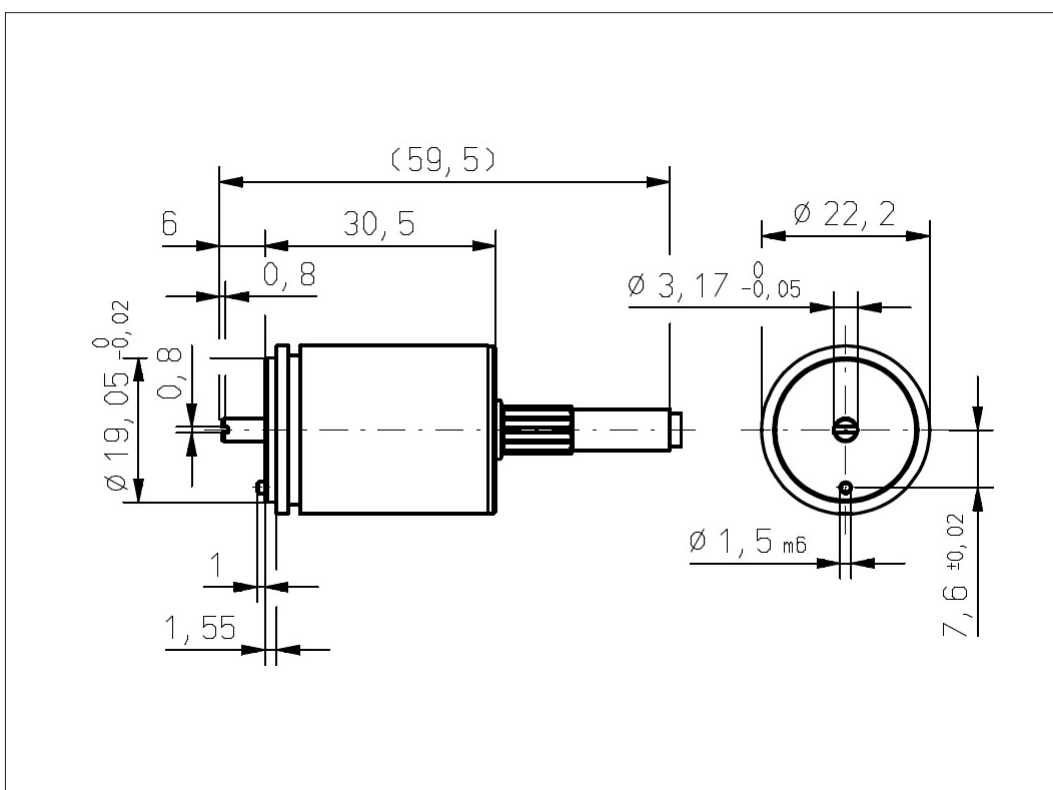
- 1x Fixation clip
- 2x Slotted cylinder head screw M3x8



### Vert-X 2212 / Vert-X 2242

#### Accessoires (incl.)

- 1x Fixation clip
- 2x Slotted cylinder head screw M3x8



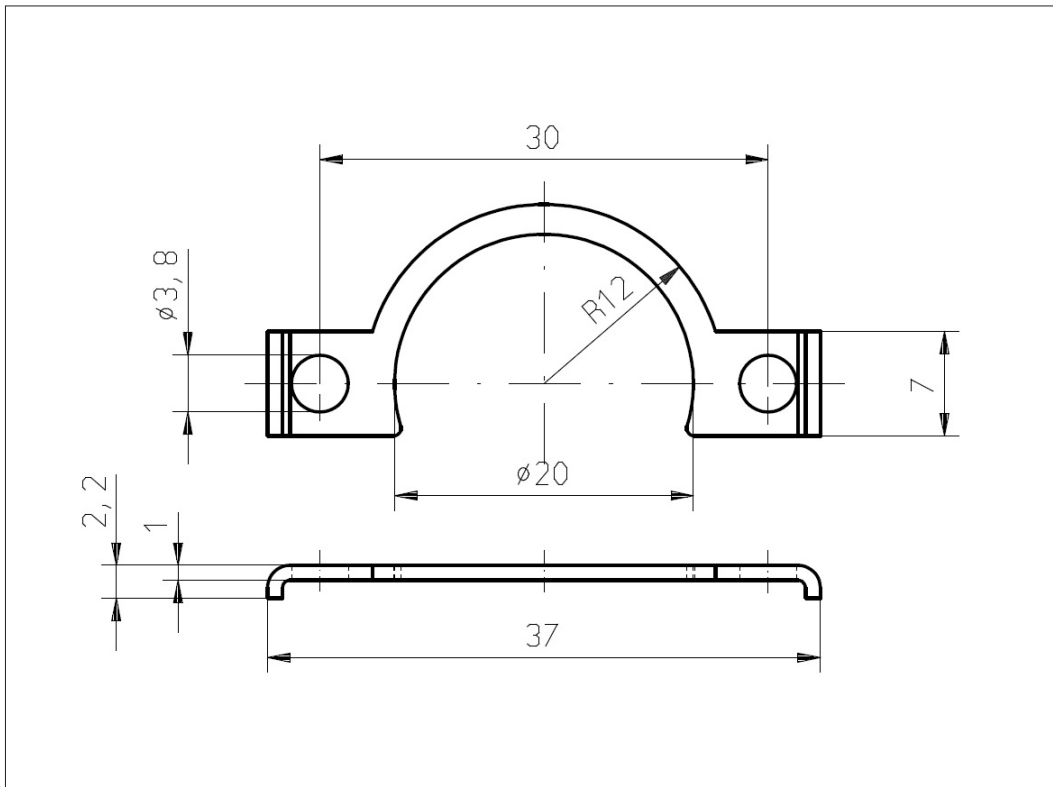
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**Vert-X 2211 / Vert-X 2212**  
**Vert-X 2241 / Vert-X 2242**  
**Accessoires**  
Fixation clip



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