



Vert-X 90E - 24V / 4 - 20mA

Applications

- Agricultural machines
- Special purpose vehicles
- Construction machines
- Stone crusher

Features general

- High protection class IP68 / IP69K
- Flat design
- Non-contacting measuring method
- Very long life
- High accuracy of measurement
- Applications under adverse ambient conditions possible (humidity, dampness, dust, dirt, vibrations etc.)
- Full resolution and accuracy at programmed electrical angle
- Detection of magnetic loss (with safety flag)
- Full redundancy possible

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)

Errors and omissions excepted. Subject to change without notice. / State: 29.04.16

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Sensor principle		MH-C	MH-C2
Electrical data			
Measuring range	°	0 ... 360	0 ... 360
Indep. linearity (typ.)	% of meas. range	±0.3	±0.3
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	µs	(800)	(800)
System propagation delay slow mode	µs	4600	2500
Max. temperature coefficient of the output signal	ppm/K	100	100
MTTFd / MTBF	year	185 / 185	147 / 147
Power supply voltage	VDC	16 ... 35	16 ... 35
Current consumption without load (typ.) fast mode	mA	(19)	(20)
Current consumption without load (typ.) slow mode	mA	14	15
Ohmic load at output	kOhm	0 ... 0.5	0 ... 0.5
Max. capacitive load at output	nF	100	100
Reverse polarity protection of power supply		yes	yes
Electrical connection (s = shielded)		Cable 3pole, s	Cable 3pole, s
Cross section of single wires	mm ²	0.56 (AWG20)	0.56 (AWG20)
Redundancy feasible		yes	yes
Electrical connection redundant (s = shielded)		2x Cable 3pole, s	2x Cable 3pole, s
Cross section of single wires redundant	mm ²	0.56 (AWG20)	0.56 (AWG20)
Mechanical data			
Mechanical range	°	360 (continuous)	360 (continuous)
Protection class		IP68 / IP69K	IP68 / IP69K
Min. life	movements	no limitation	no limitation
Operating & storage temperature	°C	-40 ... +85	-40 ... +85
EN 60068-2-6 Vibration (Amax = 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)	dB(µV/m)	max. 30	max. 30
EN 55022 class B, Emission radiated (230...1000MHz)	dB(µV/m)	max. 37	max. 37
EN 55022 class B, Emission conducted (0.15...0.5MHz)	dB(µV)	max. 56 ... 46	max. 56 ... 46
EN 55022 class B, Emission conducted (0.5...5MHz)	dB(µV)	max. 46	max. 46
EN 55022 class B, Emission conducted (5...30MHz)	dB(µV)	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



Vert-X 90E - 24V / 4 - 20mA 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

Electrical connection	
4	Standard Round cable 3pole
6	Optional Round cable 6pole
A	Optional 2x Round cable 3pole
B	Optional 2x 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 length

Output signal	
4mA ... 20mA	Standard 5

Power supply	
24VDC	Standard 1

Vert-X **9 0 E 7 7 3 6 1 5 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		
90E7	Standard	Magnetic actuator type 7
90E8	Optional	Magnetic actuator type 8
90E9	Optional	Special housing ; special magnetic actuator

	MH-C	MH-C2
Custom magnetic actuator	X	X
Custom modification of the housing	X	X
Custom cable	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
Extended operating range, axial (without safety flag)	X	X

Options (on request)

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Vert-X 90E7

Accessories (incl.)

- None

Operating range/Air gap (A) Standard with safety flag

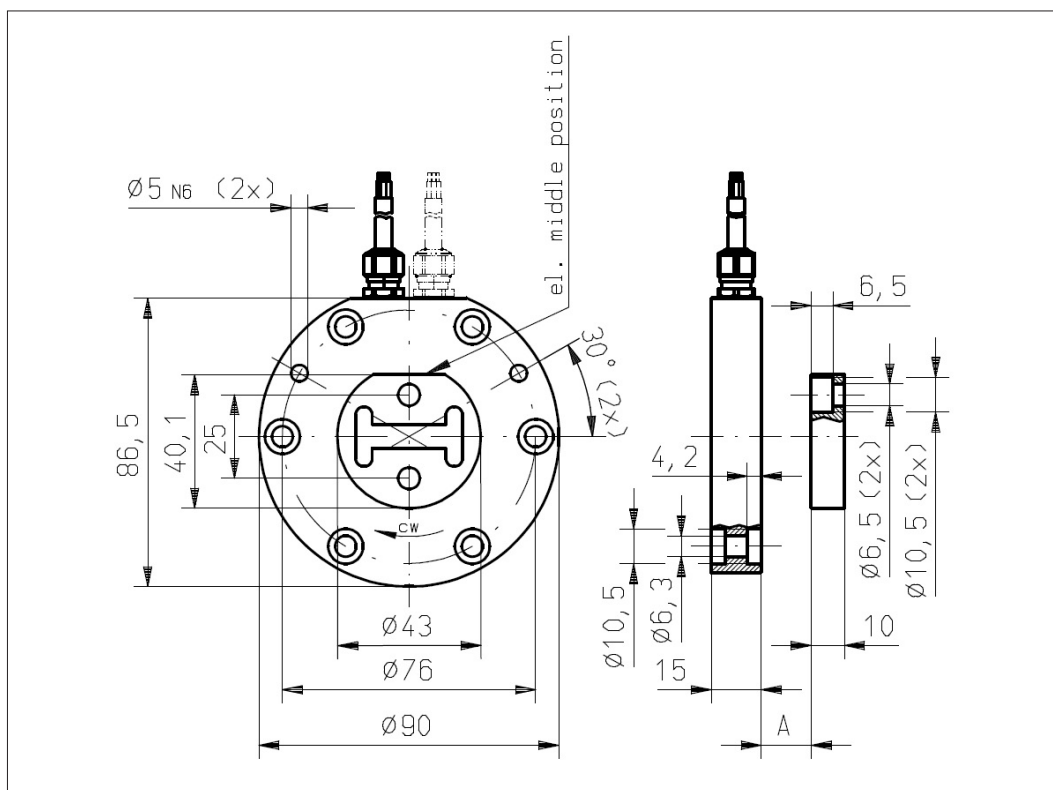
Single	0 ... 13.8mm
Redundant	0 ... 13.3mm

Extended without safety flag (Optional)

Single	0 ... 20.2mm
Redundant	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 90E8

Accessories (incl.)

- None

Operating range/Air gap (A) Standard with safety flag

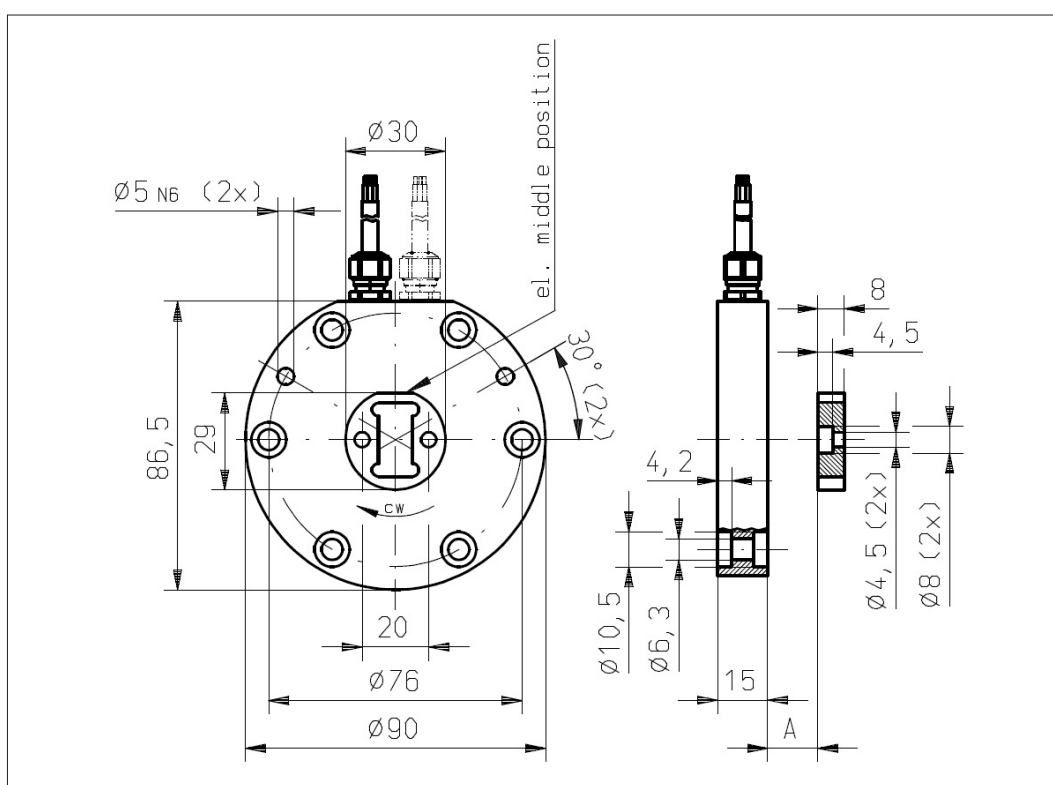
Single	0 ... 13.3mm
Redundant	0 ... 12.8mm

Extended without safety flag (Optional)

Single	0 ... 19.2mm
Redundant	0 ... 18.7mm

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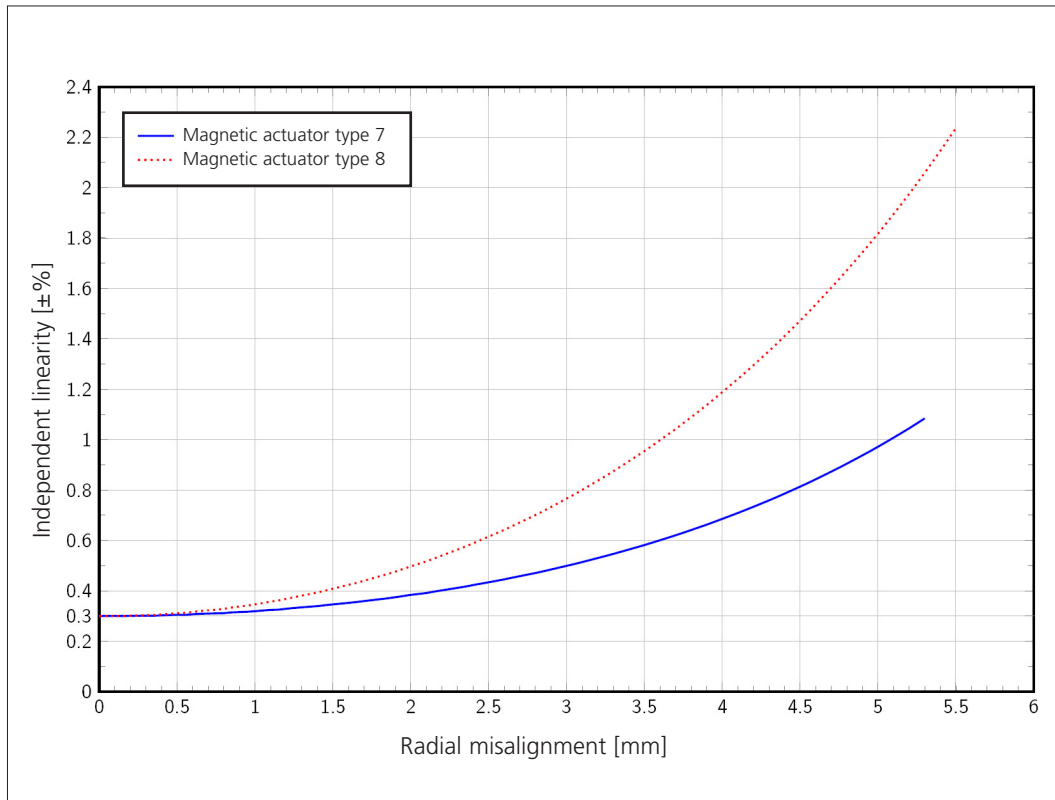
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Vert-X 90E

Indep. linearity with radial misalignment (@360°)



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