Sensor principle		MH-C	MH-C2
Electrical data			
Measuring range	°	0 ... 360	0 ... 360
Indep. linearity	% of meas. range	±0.3	±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	µs	(800)	(800)
System propagation delay slow mode	µs	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 (±10%)	5 (±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
Reverse polaritiy protection of power supply		yes	no
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)		Cable 6pole, s	Cable 6pole, 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		IP54 / IP67	IP54 / IP67
Max. starting torque at specified protection class	Ncm	0.5 / 6	0.5 / 6
Max. rotating speed	rpm	6000	6000
Min. life	movements	200 Mio.	200 Mio.
Max. permitted axial shaft load	N	45	45
Max. permitted radial shaft load	N	45	45
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
Standards			
EN 55022 class B, Emission radiated (30... 230 MHz)	dB(µV/m)	max. 30	max. 30
EN 55022 class B, Emission radiated (230...1000MHz)	dB(µV/m)	max. 37	max. 37
EN 61000-4-2, ESD (contact discharge / air discharge)	kV	±4 / ±8	±4 / ±8
EN 61000-4-3, Immission HF radiated (80... 1000 MHz)	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, Immission HF conducted (0.15...80MHz)	Vemk	10	10
EN 61000-4-8, Immission magnetic field (50Hz)	A/m	30	30
IEC 60393-1 Insualtion resistance (500VDC, 1bar, 2s)	GOhm	20	20
IEC 60393-1 Dielectric strength (VAC, 50Hz, 1min, 1bar)	kV	1	1

Vert-X 51 - 5V / 10...90% Ub

Applications
- Sensor for 360° marine propulsions
- Direction indicator device
- Agricultural machines
- Special purpose vehicles

Features general
- Compact dimensions
- 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 ±0.3%
- Resolution of 12bit
- Lower price than MH-C2

Features MH-C2
- Linearity of ±0.1%
- Resolution of 14bit
- Index point(s), sense of rotation and angle settable resp. programmable by customer (optional)

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Vert-X 51 - 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	5	1	1	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

5111	Standard	Servo mount size 20 ; 6 mm shaft ; IP54
5151	Standard	Servo mount size 20 ; 6 mm shaft ; IP67
5199	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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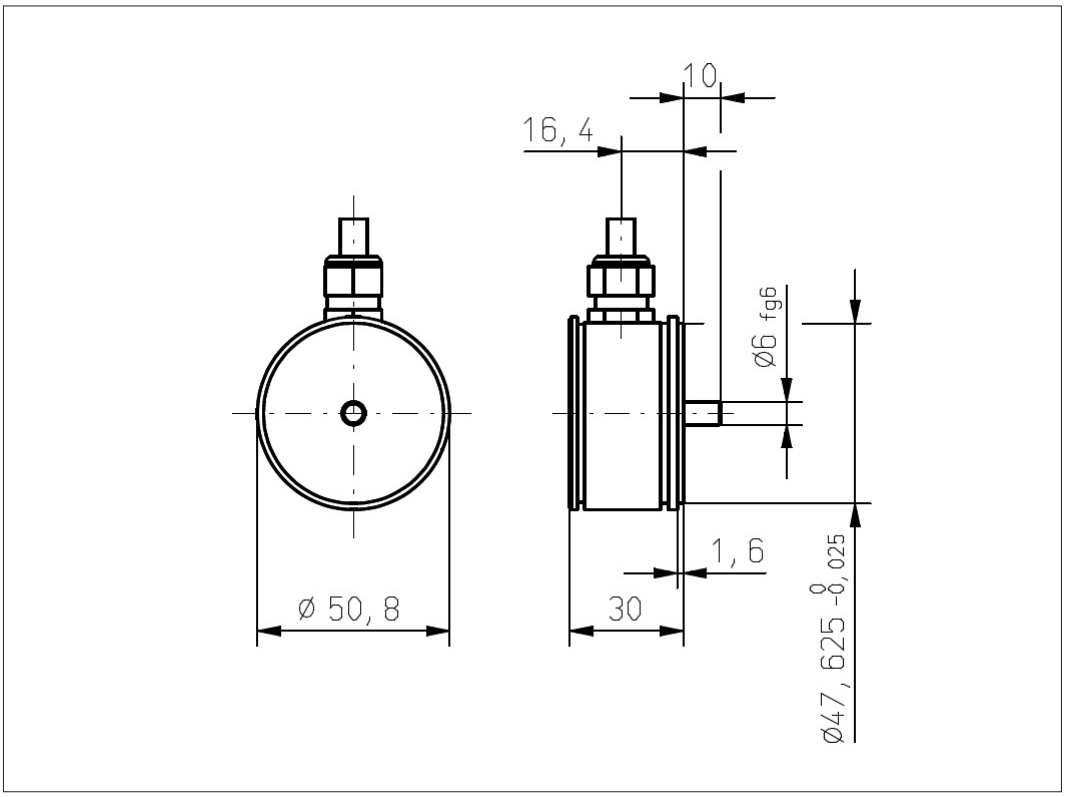

Vert-X 51

Accessoires (incl.)

- 3x Fixation clamp
- 3x Slotted cylinder head screw M3x8

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Sensor principle		MH-C	MH-C2
Electrical data			
Measuring range	°	0 ... 360	-
Indep. linearity	% of meas. range	±0.3	-
Max. hysteresis	°	0.1	-
Resolution	bit	12	-
Max. repeatability	°	0.1	-
Sample rate fast mode	kHz	(5)	-
Sample rate slow mode	kHz	1.66	-
System propagation delay fast mode	µs	(800)	-
System propagation delay slow mode	µs	4600	-
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	10	-
Max. capacitive load at output	nF	1	-
PWM frequency	Hz	855 (±20%)	-
Reverse polaritiy protection of power supply		yes	-
Electrical connection (s = shielded)		Cable 3pole, s	-
Cross section of single wires	mm^2	0.56 (AWG20)	-
Redundancy feasible		yes	-
Electrical connection redundant (s = shielded)		Cable 6pole, s	-
Cross section of single wires redundant	mm^2	0.56 (AWG20)	-
Mechanical data			
Mechanical range	°	360 (continuous)	-
Protection class		IP54 / IP67	-
Max. starting torque at specified protection class	Ncm	0.5 / 6	-
Max. rotating speed	rpm	6000	-
Min. life	movements	200 Mio.	-
Max. permitted axial shaft load	N	45	-
Max. permitted radial shaft load	N	45	-
Operating & storage temperature	°C	-40 ... +125	-
IEC 68-2-6 Vibration (Amax = 0.75mm, f = 5 … 2000 Hz)	g	20	-
IEC 68-2-27 Shock	g	50	-
Standards			
EN 55022 class B, Emission radiated (30... 230 MHz)	dB(µV/m)	max. 30	-
EN 55022 class 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, Immission HF radiated (80... 1000 MHz)	V/m	30	-
EN 61000-4-4, Burst (on all lines)	kV	±1	-
EN 61000-4-5, Surge (lines to ground)	kV	±1	-
EN 61000-4-6, Immission HF conducted (0.15...80MHz)	Vemk	10	-
EN 61000-4-8, Immission magnetic field (50Hz)	A/m	30	-
IEC 60393-1 Insualtion resistance (500VDC, 1bar, 2s)	GOhm	20	-
IEC 60393-1 Dielectric strength (VAC, 50Hz, 1min, 1bar)	kV	1	-

Vert-X 51 - 5V / PWM

Applications

- Sensor for 360° marine propulsions
- Direction indicator device
- Agricultural machines
- Special purpose vehicles

Features

- Compact dimensions
- 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

Errors and omissions excepted. Subject to change without notice. / State: 31.10.11

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CONTELEC
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Vert-X 51 - 5V / PWM
Ordering code

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

Output signal

PWM	Standard	4

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	5	1	1	1		7	3	6		2	4	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

Mechanical version

5111	Standard	Servo mount size 20 ; 6 mm shaft ; IP54
5151	Standard	Servo mount size 20 ; 6 mm shaft ; IP67
5199	Optional	Special housing ; Special shaft

	MH-C	MH-C2
Custom shaft design	X	-
Custom modification of the housing	X	-
Custom cable	X	-
Sample rate in fast mode	X	-
Switch functions TTL (max. 2)	X	-
Special characteristic curve	-	-
Special electrical angle within 30° to 360° (ex factory)	X	-
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)	-	-

Options (on request)

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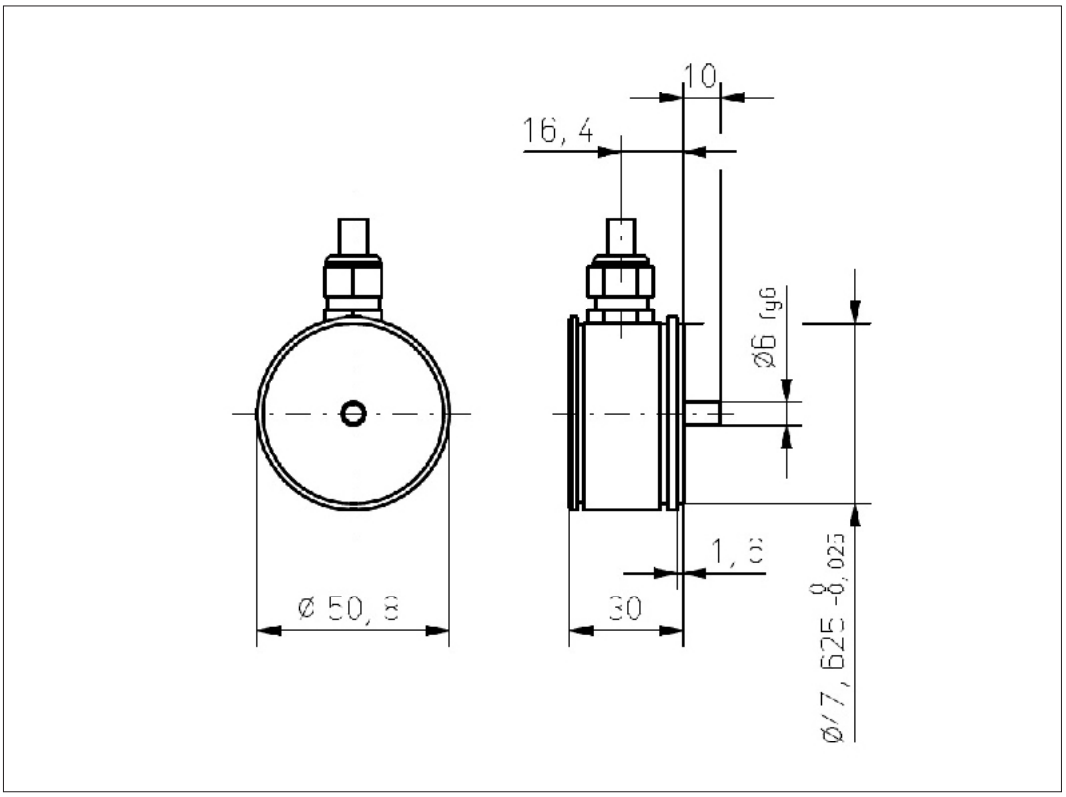

Vert-X 51

Accessoires (incl.)

- 3x Fixation clamp
- 3x Slotted cylinder head screw M3x8

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CONTELEC
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Sensor principle		MH-C	MH-C2
Electrical data			
Measuring range	°	0 ... 360	-
Indep. linearity	% of meas. range	±0.3	-
Max. hysteresis	°	0.1	-
Resolution	bit	14	-
Max. repeatability	°	0.1	-
Sample rate fast mode	kHz	2.2	-
Sample rate 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 polaritiy protection of power supply		yes	-
Electrical connection (s = shielded)		Cable 6pole, s	-
Cross section of single wires	mm^2	0.56 (AWG20)	-
Redundancy feasible		yes	-
Electrical connection redundant (s = shielded)		Cable 10pole, s	-
Cross section of single wires redundant	mm^2	0.09 (AWG28)	-
Mechanical data			
Mechanical range	°	360 (continuous)	-
Protection class		IP54 / IP67	-
Max. starting torque at specified protection class	Ncm	0.5 / 6	-
Max. rotating speed	rpm	6000	-
Min. life	movements	200 Mio.	-
Max. permitted axial shaft load	N	45	-
Max. permitted radial shaft load	N	45	-
Operating & storage temperature	°C	-40 ... +125	-
IEC 68-2-6 Vibration (Amax = 0.75mm, f = 5 … 2000 Hz)	g	20	-
IEC 68-2-27 Shock	g	50	-
Standards			
EN 55022 class B, Emission radiated (30... 230 MHz)	dB(µV/m)	max. 30	-
EN 55022 class 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, Immission HF radiated (80... 1000 MHz)	V/m	30	-
EN 61000-4-4, Burst (on all lines)	kV	±1	-
EN 61000-4-5, Surge (lines to ground)	kV	±1	-
EN 61000-4-6, Immission HF conducted (0.15...80MHz)	Vemk	10	-
EN 61000-4-8, Immission magnetic field (50Hz)	A/m	30	-
IEC 60393-1 Insualtion resistance (500VDC, 1bar, 2s)	GOhm	20	-
IEC 60393-1 Dielectric strength (VAC, 50Hz, 1min, 1bar)	kV	1	-

Vert-X 51 - 5V / SPI

Applications

- Sensor for 360° marine propulsions
- Direction indicator device
- Agricultural machines
- Special purpose vehicles

Features

- Compact dimensions
- 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

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Vert-X 51 - 5V / SPI
Ordering code

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

Output signal

SPI	Standard	8

Power supply voltage

5VDC	Standard	2

Electrical connection

1	Optional	Round cable 10pole
6	Standard	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	5	1	1	1		7	3	6		2	8	1		6	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

Mechanical version

5111	Standard	Servo mount size 20 ; 6 mm shaft ; IP54
5151	Standard	Servo mount size 20 ; 6 mm shaft ; IP67
5199	Optional	Special housing ; Special shaft

	MH-C	MH-C2
Custom shaft design	X	-
Custom modification of the housing	X	-
Custom cable	X	-
Sample rate in slow mode	X	-
Switch functions TTL (max. 2)	X	-
Special characteristic curve	-	-
Special electrical angle within 30° to 360° (ex factory)	X	-
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)	-	-

Options (on request)

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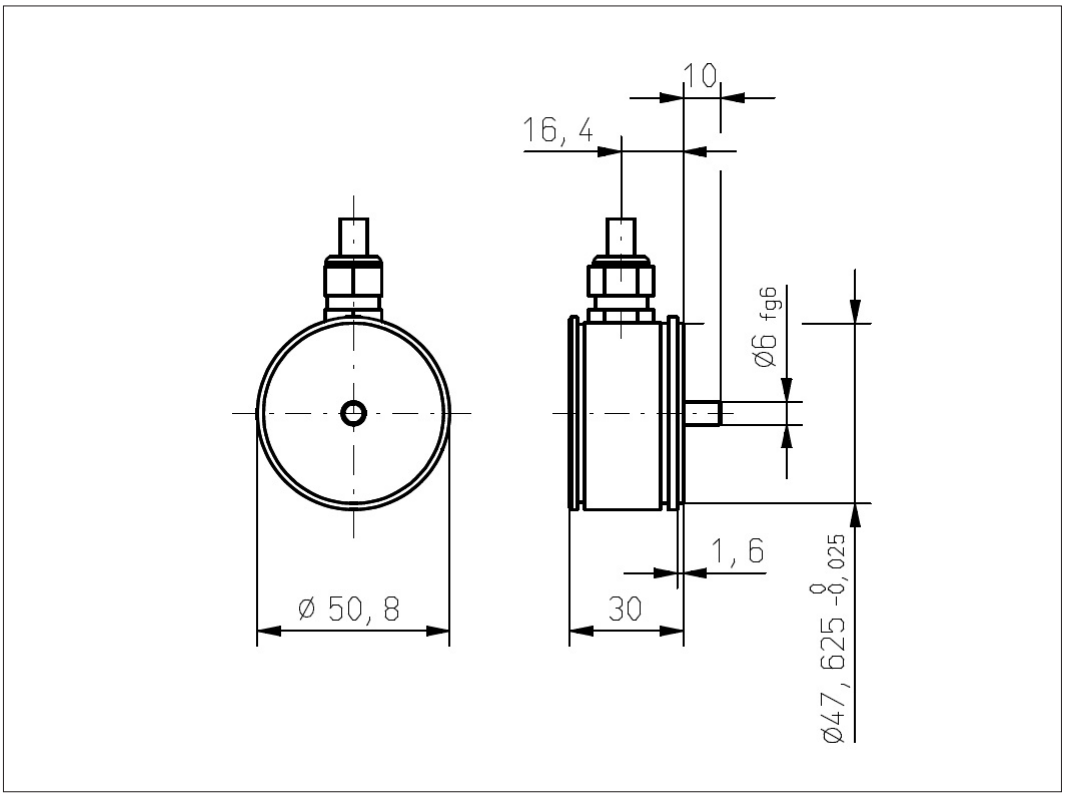

Vert-X 51

Accessoires (incl.)

- 3x Fixation clamp
- 3x Slotted cylinder head screw M3x8

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