



Vert-X 37 - 5V / 10...90% Ub

Applications

- Agricultural machines
- Construction machines
- Forest machines
- Special purpose vehicles

Features general

- Very 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
- 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)

Errors and omissions excepted. Subject to change without notice. / State: 28.09.10

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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	μ s	(800)	(800)
System propagation delay slow mode	μ 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
Reverse polarity 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 / IP68	IP54 / IP68
Max. starting torque at specified protection class	Ncm	0.5 / 6	0.5 / 6
Max. rotating speed	rpm	3000	3000
Min. life	movements	360 Mio.	360 Mio.
Max. permitted axial shaft load	N	250	250
Max. permitted radial shaft load	N	100	100
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(μ V/m)	max. 30	max. 30
EN 55022 class B, Emission radiated (230...1000MHz)	dB(μ 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	± 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 Insulation resistance (500VDC, 1bar, 2s)	GOhm	20	20
IEC 60393-1 Dielectric strength (VAC, 50Hz, 1min, 1bar)	kV	1	1



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*** 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 length

Vert-X **3 7 2 2 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	
3722	Standard Servo mount size 13 ; 10 mm shaft slotted with D-shape ; IP54
3762	Standard Servo mount size 13 ; 10 mm shaft slotted with D-shape ; IP68
3799	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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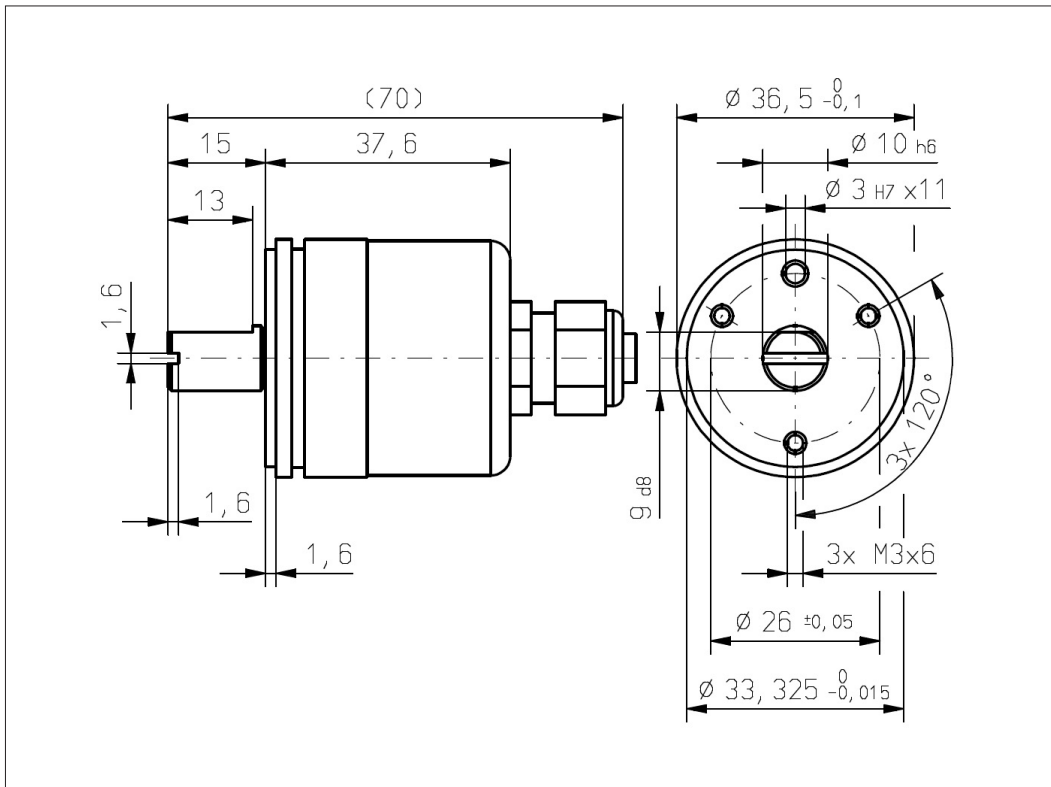
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Vert-X 37

Accessoires (incl.)

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



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Vert-X 37 - 5V / PWM

Applications

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- Construction machines
- Forest machines
- Special purpose vehicles

Features

- 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

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	10	-
Max. capacitive load at output	nF	1	-
PWM frequency	kHz	0.1 ... 1	-
Reverse polarity 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 / IP68	-
Max. starting torque at specified protection class	Ncm	0.5 / 6	-
Max. rotating speed	rpm	3000	-
Min. life	movements	360 Mio.	-
Max. permitted axial shaft load	N	250	-
Max. permitted radial shaft load	N	100	-
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, Immision 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, Immision HF conducted (0.15...80MHz)	Vemk	10	-
EN 61000-4-8, Immision magnetic field (50Hz)	A/m	30	-
IEC 60393-1 Insulation resistance (500VDC, 1bar, 2s)	GOhm	20	-
IEC 60393-1 Dielectric strength (VAC, 50Hz, 1min, 1bar)	kV	1	-

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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			
										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 length			
										Output signal PWM Standard 4			
										Power supply voltage 5VDC Standard 2			
Vert-X	3	7	2	2	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 3722 Standard Servo mount size 13 ; 10 mm shaft slotted with D-shape ; IP54 3762 Standard Servo mount size 13 ; 10 mm shaft slotted with D-shape ; IP68 3799 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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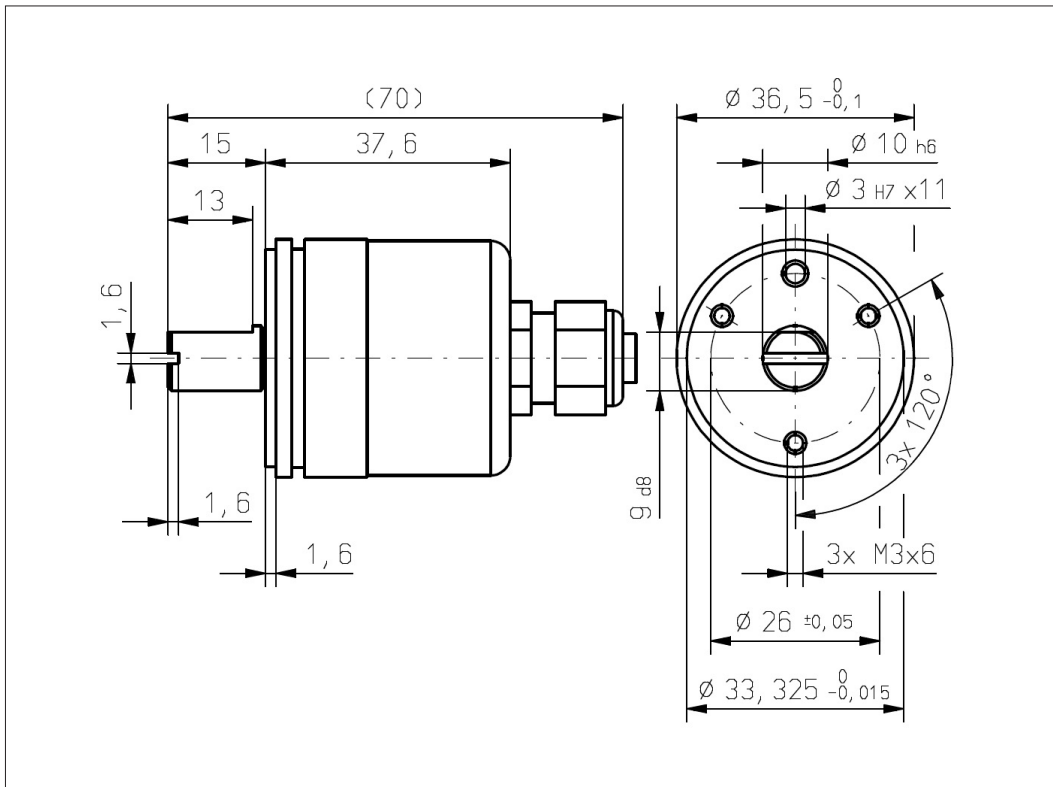
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Accessoires (incl.)

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- 3x Slotted cylinder head screw M3x8



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Vert-X 37 - 5V / SPI

Applications

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Features

- 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

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 polarity 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 / IP68	-
Max. starting torque at specified protection class	Ncm	0.5 / 6	-
Max. rotating speed	rpm	3000	-
Min. life	movements	360 Mio.	-
Max. permitted axial shaft load	N	250	-
Max. permitted radial shaft load	N	100	-
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, Immision 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, Immision HF conducted (0.15...80MHz)	Vemk	10	-
EN 61000-4-8, Immision magnetic field (50Hz)	A/m	30	-
IEC 60393-1 Insulation resistance (500VDC, 1bar, 2s)	GOhm	20	-
IEC 60393-1 Dielectric strength (VAC, 50Hz, 1min, 1bar)	kV	1	-

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Ordering code

		Output characteristics						Electrical connection					
		Positive gradient CW	Standard	1				1	Optional	Round cable 10pole			
		Positive gradient CCW	Optional	2				6	Standard	Round cable 6pole			
		Redundant, positive gradient CW	Optional	3				9	Optional	Special cable			
		Redundant, positive gradient CCW	Optional	4									
		Redundant, crossed signal curves	Optional	5									
					Output signal								
		SPI	Standard	8									
					Power supply voltage								
		5VDC	Standard	2									
Vert-X	3	7	2	2	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								
		3722	Standard	Servo mount size 13 ; 10 mm shaft slotted with D-shape ; IP54									
		3762	Standard	Servo mount size 13 ; 10 mm shaft slotted with D-shape ; IP68									
		3799	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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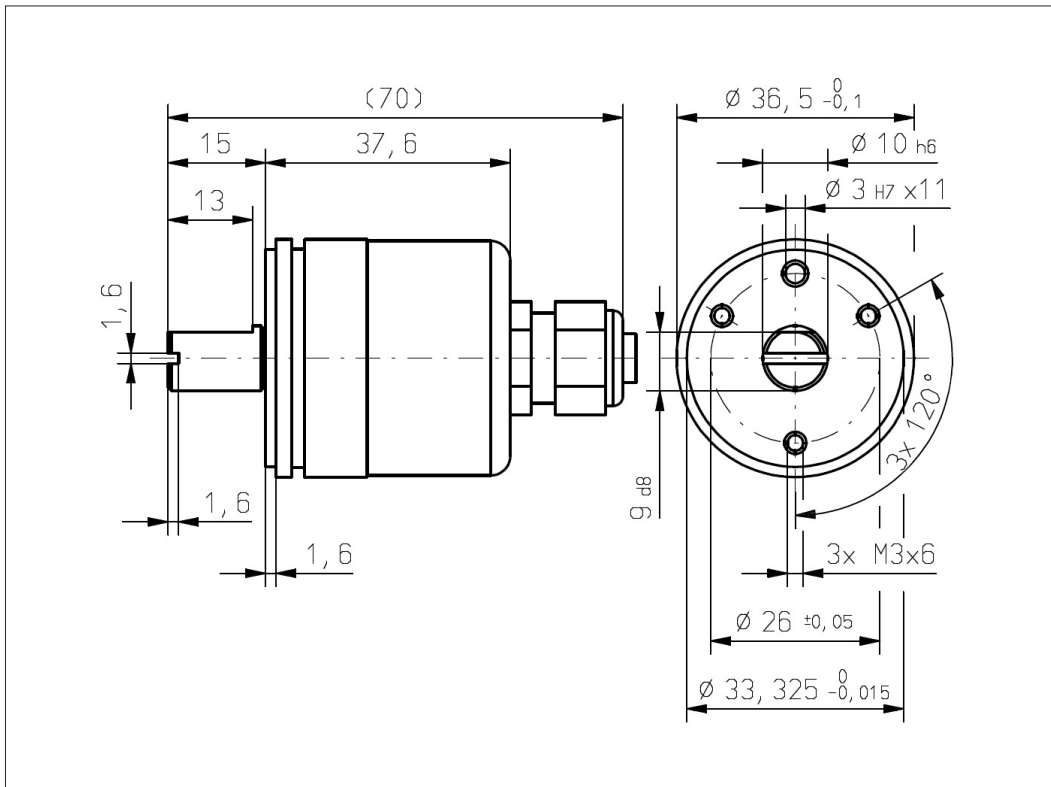
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